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ABSTRACT

This document, one of eight in a multi-cultural competency-based vocational/technical curricula series, is on combination welding. This program is designed to run 28 weeks and cover 11 instructional areas: operation of oxyacetylene equipment, oxyacetylene track torch, related equipment, Beverly shears for strip steel, portable welding equipment, tungsten inert gas welding equipment, m.i.g. welding equipment, metallic arc-welding equipment, and performing guided bend tests. A duty-task index lists competencies in each instructional area that the student should be able to perform at the end of the program. For example, in the oxyacetylene track torch operation section, a student should be able to (1) make straight-line cuts using a track torch, and (2) make bevel cuts of a 30 degree angle using a track torch. In section 1, each instructional task area contains a list of performance objectives, evaluation criterion, performance guide, and a list of tasks to be covered. In section 2, the introduction and duty-task index is repeated in English, Spanish, and Laotian. Section 3 lists technical terms concerning combination welding in English, Spanish, and Laotian. (CT)

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Multi-cultural Competency-based Vocational Curricula

Illinois State Board of Education

Adult, Vocational and Technical Education

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Laotian

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English/Laotian

ILLINOIS STATE BOARD OF EDUCATION

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Product Abstract

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COMBINATION WELDING series contains:

1. Competency-Based Curriculum in VESL.
2. Program Introduction and Outline in English; Laotian; and Spanish.
3. Lexicon of Technical Terms in VESL; English-Laotian; and English-Spanish versions.

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COMPETENCY-BASED CURRICULUM SERIES

COMBINATION WELDING

CAREER DEVELOPMENT CENTER
SCHOOL OF TECHNICAL CAREERS
SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMPETENCY-BASED VOCATIONAL/TECHNICAL CURRICULUM SERIES

COMBINATION WELDING

MASAKO T. SHIN, CURRICULUM SPECIALIST, STC, SIU-C

The preparation of this multicultural series was aided financially through funding agreements with the Illinois State Board of Education/Department of Adult, Vocational and Technical Education.

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June 1981

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LARRY HEPBURN, CENTER DIRECTOR

OUR GOAL

TO ACHIEVE THE MAXIMUM IN THE MINIMUM TIME

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INTRODUCTION

The combination welding program runs 28 weeks covering oxyacetylene welding, TIG, MIG, metallic arc, air-arc cutting and inner shield welding as well as the operation of portable welding equipment. The welding class meets 2 hours each day in related education or G.E.D. classes and 6 hours each day in the welding shop 5 days per week. During the first 15 to 16 weeks, there is one hour of shop-lecture on welding principles and theories and a minimum of 5 hours of hands-on shop work each day.

A desirable trait for any aspiring welding student is good physical health: the environmental factors and the strenuous work activities that are required of a welder automatically eliminate anyone with asthmatic, heart and lung conditions as well as back and leg problems. The student must have good eye and hand coordination and good manual dexterity. A welder needs two good eyes free from any eye problems that cannot be corrected by eyeglasses.

The student must realize that welding requires a person to perform in hot, dirty work surroundings with a degree of discomfort. However, a welder can expect to earn above average wages ($4.50 - $14.00) upon successful completion of his training program and a few years of on-the-job experience.

In the welding field, there is usually no graduated pay scale especially in coal-mine and construction welding.

Regardless of experience or seniority, the union-wage prevails for all welders performing the same type of job.

Welding has become one of the principal means of fabricating and repairing metal products. It is almost impossible to name an industry, large or small, that does not employ some type of welding. Welding has helped industry lower production costs by simplifying design and eliminating costly patterns and machining operations.

A good welder can find a job in any of the following areas: the automobile industry, the building and bridge construction industry, the shipyard and aircraft industries, appliance manufacturing, farm equipment manufacturing, the mining and oil machinery industry, the railroad industry, etc.

Learning the essential skills necessary to fulfill the many welding job requirements varies from a few months of on-the-job training to several years of formal training. A knowledge of the properties of metals, blueprint reading, and welding symbols and the mastery of welding techniques are generally required.

A course in welding followed by several years of experience is the usual procedure by which a welder learns the trade. A beginner starts on simple production line jobs and gradually works up to higher levels of skill as his experience and ability improve.

To get a higher paying welding job where the quality and strength of the weld are critical, especially in the coal mine or in construction, a welder must pass a certification or

performance test given by the employer or some other inspection authority. There is no entry-level employment for a coal-mine or construction welder. The day he gets the job, he is expected to weld just as well as the welder working next to him.

Anyone with good eye-hand coordination can learn to weld without knowing how to read. However, a good welder with good reading skills and a high school diploma will have an opportunity for advancement to inspector, foreman, or a supervisor's position.

COMBINATION WELDING: DUTY-TASK INDEX

I. OPERATION OF OXYACETYLENE EQUIPMENT

1. Assemble portable or stationary oxyacetylene equipment.
2. Check equipment for leaks.
3. Change gas cylinders.
4. Run ripple beads on steel sheet without filler rod.
5. Run beads on steel sheet with filler rod.
6. Weld lap joints on steel sheet in flat position.
7. Weld butt joints on steel sheet in flat position.
8. Weld T-joints on steel sheet in horizontal position.
9. Weld lap joints on steel sheet in horizontal position.
10. Weld butt joints on steel sheet in horizontal position.
11. Weld butt joints in vertical position using steel sheet.
12. Weld lap joints in vertical position using steel sheet.
13. Weld T-joints on steel sheet in vertical position.
14. Weld a lap joint in overhead position.
15. Weld T-joints in overhead position.
16. Weld butt joints in overhead position.
17. Cut carbon steel with cutting torch.
18. Repair cast iron with bronze-welding.
19. Lead-solder a ferrous metal.
20. Silver-solder a ferrous metal.

II. OPERATION OF OXYACETYLENE TRACK TORCH

1. Make straight-line cuts using a track torch.
2. Make bevel cuts with 30° angle using a track torch.

III. OPERATION OF RELATED EQUIPMENT

1. Use of a tap and die set (internal threads).
2. Drill metal parts with power equipment.
3. Use of a hand hacksaw.
4. Grind metal parts using a portable grinder (air or electric).
5. Grind the metal parts using a pedestal grinder.
6. Clean metal parts with a power wire brush.
7. Cut metals with a power hacksaw.

IV. OPERATION OF RELATED EQUIPMENT - BEVERLY SHEARS FOR STRIP STEEL

1. Cut strip steel for oxyacetylene welding.

COMBINATION WELDING: DUTY-TASK INDEX

V. OPERATION OF PORTABLE WELDING EQUIPMENT

1. Conduct a daily maintenance check on the equipment.
2. Weld various joints on mild steel in all positions with a variety of electrodes.

VI. OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

1. Weld butt joints on aluminum with TIG.
2. Weld lap joints on aluminum with TIG.
3. Weld T-joints on aluminum with TIG.
4. Weld butt joints on steel with TIG.
5. Weld lap joints on steel with TIG.
6. Weld T-joints on steel with TIG.

VII. OPERATION OF M.I.G. WELDING EQUIPMENT

1. Fillet-weld in horizontal position using .035 diameter wire.
2. Fillet-weld in vertical position using .035 diameter wire.
3. Fillet-weld in overhead position using .035 diameter wire.

VIII. OPERATION OF METALLIC ARC-WELDING EQUIPMENT

1. Learn to strike the arc.
2. Run continuous beads.
3. Build up a worn surface (padding).
4. Fillet-weld in horizontal position.
5. Fillet-weld stringer beads in vertical position.
6. Fillet-weld weave beads in vertical position.
7. Fillet-weld in overhead position.
8. Weld a V-groove in vertical position with stringer beads.
9. Weld V-groove in vertical position with weave beads.
10. Weld V-groove in overhead position.
11. Prepare a test plate for guided bend test.
12. Fillet-weld in horizontal position using stainless steel electrodes.
13. Fillet-weld in vertical position using stainless steel electrodes.
14. Build up a surface using stainless steel electrodes.

IX. PERFORM GUIDED BEND TESTS

1. Bend weld samples using hydraulic press.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Assemble portable or stationary oxyacetylene equipment.

Performance Objectives:

Given a demonstration, necessary equipment and proper tools, the student will assemble oxyacetylene welding equipment in a safe and proper order.

Evaluation Criterion:

The student will set up the equipment in the correct and proper sequence to the instructor's satisfaction.

Performance Guide:

1. Secure cylinders.
2. Remove caps.
3. Crack tank valves to remove foreign matter.
4. Attach regulators.
5. Attach hoses.
6. Blow out hoses.
7. Attach torch body and tip.
8. Turn on the tank pressure.
9. Adjust the regulators to proper working pressure.
10. Turn tanks off.
11. Check the working pressure for drop in pressure.
12. Have the instructor check on the set-ups.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Check equipment for leaks.

Performance Objectives:

Given a demonstration and the necessary equipment, the student will adjust for the proper pressure and test the equipment for leaks.

Evaluation Criterion:

The student will perform a soap-and-water leak test on the oxyacetylene equipment to the satisfaction of the instructor.

Performance Guide:

1. Apply pressure to the regulators.
2. Close the torch valves.
3. Apply a mixture of soap and water to all connections.
4. Check for bubbles.
5. If the bubble is present, tighten or repair.
6. Check again for bubbles.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Change gas cylinders.

Performance Objectives:

Given a demonstration, proper tools and equipment, the student will safely change the gas cylinders.

Evalution Criterion:

The student will replace the gas cylinders, observing all the safety rules to the satisfaction of the instructor.

Performance Guide:

1. Close cylinder valves.
2. Bleed the regulator.
3. Remove the regulator.
4. Unchain the cylinders.
5. Remove the empty (cylinder) to the storage area.
6. Bring a full cylinder.
7. Remove the cap.
8. Crack the valve.
9. Attach the regulator.
10. Check for leaks.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Run ripple beads on steel sheet without filler rod.

Performance Objectives:

Given a demonstration, welding equipment, tools and materials, the student will run beads on metal with no filler wire.

Evaluation Criterion:

The student will set up the equipment properly and run the beads in flat position to the satisfaction of the instructor. The beads should be uniform, straight, and of proper width.

Performance Guide:

1. Follow the proper safety procedures.
2. Select the proper equipment.
3. Run beads in flat position.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Run beads on steel sheet with filler rod.

Performance Objectives:

Given a demonstration, equipment, tools and materials, the student will run beads on steel sheet with filler rod.

Evaluation Criterion:

The student will set up the equipment in proper sequence and run a proper formation of beads to the satisfaction of the instructor. The beads should be uniform, straight and of proper height and width.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper equipment.
3. Run beads with filler wire.
4. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld lap joints on steel sheet in flat position.

Performance Objectives:

Given a demonstration, equipment, tools, and materials, the student will weld lap joints on sheet metal.

Evaluation Criterion:

The student will set up the equipment in proper sequence and weld lap joints to the satisfaction of the instructor. The welds should have proper size, penetration and reinforcement.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Tack weld pieces.
4. Run lap joints according to specifications.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld butt joints on steel sheet in flat position.

Performance Objectives:

Given a demonstration, equipment, tools, and necessary materials, the student will set up, tack weld, and weld butt joints on steel sheet.

Evaluation Criterion:

The student will set up the welding equipment, following the prescribed safety procedures, and weld butt joints with proper fusion, full penetration, and bead contour to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Run butt joints.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld T-joints on steel sheet in horizontal position.

Performance Objectives:

Given a demonstration, equipment, tools and materials, the student will set up, tack weld and weld T-joints on steel sheet in horizontal position.

Evaluation Criterion:

The student will set up the equipment properly and weld the T-joints with proper bead size, contour and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld T-joints.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld lap joints on steel sheet in horizontal position.

Performance Objectives:

Given a demonstration, equipment, necessary tools and materials, the student will set up, tack weld, and weld lap joints in horizontal position.

Evaluation Criterion:

The student will weld lap joints in horizontal position with proper bead size, contour and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld lap joints in horizontal position.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld butt joints on steel sheet in horizontal position.

Performance Objectives:

Given a demonstration, equipment, necessary tools and materials, the student will set up, tack weld, and weld butt joints in horizontal position.

Evaluation Criterion:

The student will weld butt joints in horizontal position with proper bead size, contour, and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the proper safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld butt joints in horizontal position.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld butt joints in vertical position using steel sheet.

Performance Objectives:

Given a demonstration, necessary equipment and supplies, the student will set up, tack weld, and weld butt joints in vertical position using steel sheet.

Evaluation Criterion:

The student will weld butt joints in vertical position with proper bead size, contour and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld vertical butt joints.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld lap joints in vertical position using steel sheet.

Performance Objectives:

Given a demonstration, equipment, tools and necessary materials, the student will set up, tack weld, and weld lap joints in vertical position.

Evaluation Criterion:

The student will set up the equipment properly and weld lap joints in vertical position with proper bead size, contour and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld vertical lap joints.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld T-joints on steel sheet in vertical position.

Performance Objectives:

Given a demonstration, equipment, tools and necessary materials, the student will set up, tack weld and weld T-joints in vertical position.

Evaluation Criterion:

The student will set up the equipment properly and weld T-joints in vertical position with proper bead size, contour and fusion to the satisfaction of the instructor.

Performance Guide:

1. Follow the safety procedures.
2. Select the proper equipment.
3. Set up the metal.
4. Tack weld.
5. Weld vertical T-joints.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld a lap-joint in overhead position.

Performance Objectives:

Given a demonstration, safety equipment, tools and materials, the student will weld lap joints in overhead position with proper contour, fusion and weld quality.

Evaluation Criterion:

The student will weld lap joints in overhead position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper equipment.
3. Set up and tack-weld.
4. Weld lap joints.
5. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld T-joints in overhead position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld T-joints in an overhead position with proper contour, fusion and weld quality.

Evaluation Criterion:

The student will set up and weld T-joints in overhead position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper equipment.
3. Set up and tack-weld.
4. Weld T-joints.
5. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Weld butt-joints in overhead position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld butt-joints in overhead position with proper contour, fusion and weld quality.

Evaluation Criterion:

The student will set up and weld butt-joints in overhead position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper equipment.
3. Set up and tack-weld.
4. Weld butt-joints.
5. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Cut carbon steel with cutting torch.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will cut carbon steel ranging from 1/8" to 1" thickness using a cutting torch.

Evaluation Criterion:

The student will cut carbon steel with an oxyacetylene torch to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the cutting torch.
3. Select a proper tip.
4. Adjust the regulator pressure according to the metal thickness.
5. Cut the metal.
6. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Repair cast iron with bronze-welding.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will bevel, clean and repair cast iron by bronze-welding.

Evaluation Criterion:

The student will set up and bronze-weld cast iron to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Bevel cast iron if necessary.
3. Stop-drill if necessary.
4. Select welding rod and flux.
5. Bronze-weld the joints.
6. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Lead-solder a ferrous metal.

Performance Objectives:

Given a demonstration, safety equipment, tools and materials, the student will lead-solder joints.

Evaluation Criterion:

The student will set up and lead-solder sheet metal to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the welding rod and flux.
3. Clean the metal surfaces to be joints.
4. Select a proper tip size.
5. Solder joints to specification.
6. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE EQUIPMENT

TASK: Silver-solder a ferrous metal.

Performance Objectives:

Given a demonstration, safety equipment, tools and materials, the student will silver-solder sheet metal.

Evaluation Criterion:

The student will set up and silver-solder the sheet metal to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the welding rod and flux.
3. Clean the metal surfaces to be joined.
4. Select a proper tip size.
5. Solder the joints to specification.
6. Have the instructor check your work.

DUTY: OPERATION OF OXYACETYLENE TRACK TORCH

TASK: Make straight-line cuts using a track torch.

Performance Objectives:

Given a demonstration, equipment, tools and material, the student will make cuts in a steel plate using proper tip size and gas pressure for the metal to be cut.

Evaluation Criterion:

The student will complete the job to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the material.
3. Select a proper tip.
4. Adjust the gas pressure for the material to be cut.
5. Set the torch angle for a 90° cut.
6. Adjust the travel speed.
7. Preheat the metal.
8. Make straight-line cuts.
9. Have the instructor check your cuts.

DUTY: OPERATION OF OXYACETYLENE TRACK TORCH

TASK: Make bevel cuts with 30° angle using a track torch.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will make bevel cuts with a 30° angle in a steel plate using proper tip size and gas pressure for the metal to be cut.

Evaluation Criterion:

The student will complete the job to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the material.
3. Select a proper tip.
4. Adjust the gas pressure for the material to be cut.
5. Set the torch angle for a 30° bevel cut.
6. Adjust the travel speed.
7. Preheat the metal.
8. Make 30° angle bevel cuts.
9. Have the instructor check your cuts.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Use of a tap and die set (internal threads).

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will lay out, mark and drill holes in preparation for cutting internal threads according to specifications.

Evaluation Criterion:

The student will lay out, mark, drill holes and cut the internal threads to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Lay out the metal.
3. Select a proper drill bit.
4. Secure the metal.
5. Drill holes.
6. Select a correct tap.
7. Cut internal threads according to specifications.
8. Have the instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Drill metal parts with power equipment.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will lay out, mark and drill holes according to specifications.

Evaluation Criterion:

The student will lay out, mark and drill holes to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures
2. Lay out the metal and center-punch.
3. Select a proper bit and set up the press.
4. Secure the metal.
5. Drill the holes to specifications.
6. Have the instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Use of a hand-hacksaw.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will lay out and cut metal using a hand-hacksaw.

Evaluation Criterion:

The student will lay out and cut metal with a hand hacksaw to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select tools.
3. Lay out the metal.
4. Cut the metal using a hand-hacksaw.
5. Have your instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Grind metal parts using a portable grinder (air or electric)

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will clean and prepare metal parts for welding, using portable grinders.

Evaluation Criterion:

The student will grind and clean the metal parts with portable equipment to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select and inspect equipment.
3. Secure the metal for grinding.
4. Grind the metal parts.
5. Have the instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Grind the metal parts using a pedestal grinder.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will clean and prepare metal parts for welding with a pedestal grinder.

Evaluation Criterion:

The student will prepare the metal parts for welding to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select and inspect the equipment.
3. Grind the metal parts.
4. Have the instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Clean metal parts with a power wire brush.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will remove rust, scale or other foreign matter from the parts to be welded.

Evaluation Criterion:

The student will clean metal parts with a wire brush to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select and inspect the equipment.
3. Clean the metal parts.
4. Have the instructor check your work.

DUTY: OPERATION OF RELATED EQUIPMENT

TASK: Cut metals with a power hacksaw.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will cut metal to the required length using a power hacksaw.

Evaluation Criterion:

The student will lay out and cut the metal to the specified lengths to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the appropriate tools.
3. Lay out the metal.
4. Install a blade.
5. Clamp the metal parts to be cut.
6. Cut the metal.
7. Have the instructor check your cut.

DUTY: OPERATION OF RELATED EQUIPMENT - BEVERLY SHEARS FOR STRIP STEEL

TASK: Cut strip steel for oxyacetylene welding.

Performance Objectives:

Given a demonstration, the student will operate Beverly shears in a safe and proper manner and cut strip steel to the proper size for oxyacetylene welding.

Evaluation Criterion:

The student will complete the task to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper metal.
3. Set stop on shears.
4. Cut the metal to the proper size.
5. Have the instructor check your cut.

DUTY: OPERATION OF PORTABLE WELDING EQUIPMENT

TASK: Conduct a daily maintenance check on the equipment.

Performance Objectives:

Given a work sheet, the student will check oil and water level, record the number of hours the equipment was in use, and perform any maintenance necessary.

Evaluation Criterion:

The student will conduct a daily maintenance check of the equipment and perform necessary maintenance operations to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Check oil, water, batteries, air and oil filters; lubricate if necessary.
3. Record the number of hours.
4. Have the instructor observe you while you conduct the maintenance operation.

DUTY: OPERATION OF PORTABLE WELDING EQUIPMENT

TASK: Weld various joints on mild steel in all positions with a variety of electrodes.

Performance Objectives:

The student will weld various joints in all positions with portable welding equipment.

Evaluation Criterion:

The student will complete the welds to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select a proper welding rod for each job.
3. Set up and tack weld in various positions.
4. Weld joints as specified.
5. Have the instructor check your weld.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld butt-joints on aluminum with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld butt-joints on aluminum sheet in flat position with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld butt-joints on aluminum in flat position according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete the butt-joints to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld lap-joints on aluminum with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld lap-joints on aluminum sheet in flat position with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld lap-joints on aluminum in flat position according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete the lap-joints to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld T-joints on aluminum with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld T-joints on aluminum sheet in flat position with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld T-joints on aluminum in flat position according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select a correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete the T-joints to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld butt-joints on steel with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld butt-joints in flat position on steel sheet with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld butt-joints on steel sheet according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Set the machine on correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete butt-weld to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld lap-joints on steel with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld lap-joints in flat position on steel sheet with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld lap-joints on steel sheet according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Set the machine on correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete lap-weld to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF TUNGSTEN INERT GAS WELDING EQUIPMENT

TASK: Weld T-joints on steel with TIG.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will weld T-joints in flat position on steel sheet with filler rod. The weld should have a proper contour, fusion and penetration.

Evaluation Criterion:

The student will weld T-joints on steel sheet according to specifications.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Set the machine on correct type of current.
4. Check the water flow.
5. Check the gas flow.
6. Make sure that the tungsten electrode is clean.
7. Complete T-weld to specification.
8. Have the instructor check your work.

DUTY: OPERATION OF M.I.G. WELDING EQUIPMENT

TASK: Fillet-weld in horizontal position using .035 diameter wire.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will set up and weld fillets in horizontal position with a proper contour, fusion and weld quality.

Evaluation Criterion:

The student will fillet-weld to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper wire size.
3. Set up the machine and adjust for proper voltage and amperage.
4. Set up and tack weld the metal parts and weld fillets.
5. Have the instructor check your weld.

DUTY: OPERATION OF M.I.G. WELDING EQUIPMENT

TASK: Fillet-weld in vertical position using .035 diameter wire.

Performance Objectives:

Given a demonstration, safety equipment, tools and material, the student will set up and weld fillets in vertical position with .035 diameter wire. The weld should have a proper contour, fusion and weld quality.

Evaluation Criterion:

The student will set up and fillet-weld in vertical position to the satisfaction of the instructor.

Performance Guide:

1. Observe safety procedure.
2. Select the proper wire size.
3. Set up the machine and adjust for proper voltage and amperage.
4. Set up and tack weld the metal parts and weld fillets in vertical position.
5. Have the instructor check your weld.

DUTY: OPERATION OF M.I.G. WELDING EQUIPMENT

TASK: Fillet-weld in overhead position using .035 diameter wire.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will set up and weld fillets in overhead position with a proper contour, fusion and weld quality.

Evaluation Criterion:

The student will set up the equipment and weld fillets in overhead position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select a proper wire size.
3. Set up the machine and adjust for proper voltage and amperage.
4. Set up and tack weld the metal parts; weld fillets in overhead position.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Learn to strike the arc.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will practice striking the arc at proper angles and arc length.

Evaluation Criterion:

The student will strike the arc to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select the proper equipment.
3. Set up the equipment.
4. Select the proper electrodes.
5. Practice striking the arc.
6. As you practice striking the arc properly, have the instructor observe your operation.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Run continuous beads.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will weld continuous beads with a proper contour and weld quality.

Evaluation Criterion:

The student will set up the equipment properly and run continuous beads to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the proper electrode.
4. Run continuous beads.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Build up a worn surface (padding).

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary material, the student will build up a worn surface with proper bead contour and weld quality.

Evalaution Criterion:

The student will set up the equipment properly and weld, building up the worn surface in flat position using 1/8" and 5/32" electrodes such as E6010, E6011, E6013 and E7014.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the proper electrodes.
4. Build up tne surface.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld in horizontal position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will weld fillets in horizontal position with proper contour and weld quality.

Evaluation Criterion:

The student will fillet-weld using 1/8" and 5/32" electrodes, such as E6010, E6011, E6013, E7014, and E7018, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the proper electrodes.
4. Run fillet-welds in horizontal position.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld stringer beads in vertical position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will weld stringer beads in vertical position with proper bead contour and weld quality.

Evaluation Criterion:

The student will fillet-weld stringer beads using 1/8" and 5/32" electrodes, such as E6010, E6011, E6013, E7014, and E7018, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the proper electrodes.
4. Run stringer beads in vertical position.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld weave beads in vertical position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will fillet-weld weave beads in vertical position with proper bead contour and weld quality.

Evaluation Criterion:

The student will set up the equipment properly and fillet-weld using 1/8" and 5/32" electrodes, such as E6010, E6011, E6013, E7014, and E7018, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment properly.
3. Select the proper electrodes.
4. Run weave beads in vertical position.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld in overhead position.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will weld fillets in an overhead position with proper contour and weld quality.

Evaluation Criterion:

The student will set up the equipment properly and fillet-weld using 1/8" and 5/32" electrodes, such as E6010, E6011, E6013, E7014, and E7018, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment properly.
3. Select the proper electrodes.
4. Weld fillets in overhead position.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld in horizontal position using stainless steel electrodes.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will weld fillets in horizontal position using stainless steel electrodes.

Evaluation Criterion:

The student will set up the equipment properly and weld fillets in horizontal position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the metal and electrodes.
4. Tack weld the parts.
5. Weld fillets in horizontal position with stainless steel electrodes.
6. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Fillet-weld in vertical position using stainless steel electrodes.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will weld fillets in vertical position using stainless steel electrodes.

Evaluation Criterion:

The student will set up the equipment properly and weld fillets in vertical position to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the metal and electrodes.
4. Tack weld the parts.
5. Weld fillets in vertical position with stainless steel electrodes.
6. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Build up a surface using stainless steel electrodes.

Performance Objectives:

Given a demonstration, equipment, tools and necessary material, the student will build up a surface using stainless steel electrodes.

Evaluation Criterion:

The student will set up the equipment and build up a surface in flat position using 1/8" and 5/32" stainless steel electrodes to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Set up the equipment.
3. Select the metal and electrodes.
4. Build up the metal surface using stainless steel electrodes.
5. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Weld a V-groove in vertical position with stringer beads.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will set up V-groove welds with a back-up strip in vertical position with stringer beads. The completed welds should have full penetration, good fusion on sides, proper contour, uniformity, and weld quality.

Evaluation Criterion:

The student will set up and weld V-groove in vertical position with stringer beads, using E7018 electrode, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select 3/4" steel plates.
3. Bevel at 30° angle.
4. Clean the cut surface with grinder.
5. Tack weld a 1/8" back-up strip to the beveled plates.
6. Complete V-groove weld in vertical position with stringer beads.
7. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Weld V-groove in vertical position with weave beads.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will set up V-groove welds with a back-up strip in vertical position with weave beads. The completed welds should have full penetration, good fusion on sides, proper contour, uniformity and weld quality.

Evaluation Criterion:

The student will set up and weld V-groove in vertical position with weave beads, using E7018 electrode, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select 3/4" steel plates.
3. Bevel at 30° angle.
4. Clean the cut surface with grinder.
5. Tack weld a 1/8" back-up strip to the beveled plates.
6. Complete V-groove weld in vertical position with weave beads.
7. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Weld V-groove in overhead position.

Performance Objectives:

Given a demonstration, safety equipment, tools and necessary materials, the student will set up V-groove welds with a back-up strip in overhead position. The completed welds should have full penetration, good fusion on sides, proper contour, uniformity and weld quality.

Evaluation Criterion:

The student will set up and weld V-groove in overhead position, using E7018 electrode, to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Select 3/4" steel plate.
3. Bevel at 30° angle.
4. Clean the cut surfaces with grinder.
5. Tack weld a 1/8" back-up strip to the beveled plates.
6. Complete the V-groove weld in overhead position.
7. Have the instructor check your weld.

DUTY: OPERATION OF METALLIC ARC-WELDING EQUIPMENT

TASK: Prepare a test plate for guided bend test.

Performance Objectives:

Given a demonstration and necessary equipment, the student will remove the back-up strip from the weld and run the guided bend test. The weld reinforcement should be ground flush and sanded. Burrs should be removed from the edges.

Evaluation Criterion:

The student will prepare a sample for guided bend test to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Remove the back-up strip from weld samples.
3. Cut two 3/4" samples from the weld:
   a. Measure 1" from each end of the plate.
   b. From that point, mark 3/4" for sample.
   c. Take one sample from each end of the weld.
4. Grind all sides smooth.
5. Remove burrs from edges.
6. Have the instructor check your preparation procedures for guided bend test.

DUTY: PERFORM GUIDED BEND TESTS

TASK: Bend weld samples using hydraulic press.

Performance Objectives:

Given a demonstration on equipment, the student will perform the guided bend test on a weld sample that the student has welded and prepared for the guided bend test.

Evaluation Criterion:

The student will run the guided bend test on his weld sample to the satisfaction of the instructor.

Performance Guide:

1. Observe the safety procedures.
2. Insert the weld specimen on hydraulic press.
3. Center the weld over the bend area.
4. Bend the weld to 180°.
5. Test one sample using a side bend and another sample using a root bend.
6. Have the instructor observe you as you run the test.

Introduction and Outline:

English
Spanish
Laotian

CE029 802

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SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMPETENCY-BASED VOCATIONAL/TECHNICAL CURRICULUM SERIES

INTRODUCTION TO COMBINATION WELDING

MASAKO T. SHIN, CURRICULUM SPECIALIST, STC, SIU-C

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June 1981

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Regardless of experience or seniority, the union-wage prevails for all welders performing the same type of job.

Welding has become one of the principal means of fabricating and repairing metal products. It is almost impossible to name an industry, large or small, that does not employ some type of welding. Welding has helped industry lower production costs by simplifying design and eliminating costly patterns and machining operations.

A good welder can find a job in any of the following areas: the automobile industry, the building and bridge construction industry, the shipyard and aircraft industries, appliance manufacturing, farm equipment manufacturing, the mining and oil machinery industry, the railroad industry, etc.

Learning the essential skills necessary to fulfill the many welding job requirements varies from a few months of on-the-job training to several years of formal training. A knowledge of the properties of metals, blueprint reading, and welding symbols and the mastery of welding techniques are generally required.

A course in welding followed by several years of experience is the usual procedure by which a welder learns the trade. A beginner starts on simple production line jobs and gradually works up to higher levels of skill as his experience and ability improve.

To get a higher paying welding job where the quality and strength of the weld are critical, especially in the coal mine or in construction, a welder must pass a certification or

performance test given by the employer or some other inspection authority. There is no entry-level employment for a coal-mine or construction welder. The day he gets the job, he is expected to weld just as well as the welder working next to him.

Anyone with good eye-hand coordination can learn to weld without knowing how to read. However, a good welder with good reading skills and a high school diploma will have an opportunity for advancement to inspector, foreman, or a supervisor's position.

COMBINATION WELDING: DUTY-TASK INDEX

I. OPERATION OF OXYACETYLENE EQUIPMENT

1. Assemble portable or stationary oxyacetylene equipment.
2. Check equipment for leaks.
3. Change gas cylinders.
4. Run ripple beads on steel sheet without filler rod.
5. Run beads on steel sheet with filler rod.
6. Weld lap joints on steel sheet in flat position.
7. Weld butt joints on steel sheet in flat position.
8. Weld T-joints on steel sheet in horizontal position.
9. Weld lap joints on steel sheet in horizontal position.
10. Weld butt joints on steel sheet in horizontal position.
11. Weld butt joints in vertical position using steel sheet.
12. Weld lap joints in vertical position using steel sheet.
13. Weld T-joints on steel sheet in vertical position.
14. Weld a lap joint in overhead position.
15. Weld T-joints in overhead position.
16. Weld butt joints in overhead position.
17. Cut carbon steel with cutting torch.
18. Repair cast iron with bronze-welding.
19. Lead-solder a ferrous metal.
20. Silver-solder a ferrous metal.

II. OPERATION OF OXYACETYLENE TRACK TORCH

1. Make straight-line cuts using a track torch.
2. Make bevel cuts with 30° angle using a track torch.

III. OPERATION OF RELATED EQUIPMENT

1. Use of a tap and die set (internal threads).
2. Drill metal parts with power equipment.
3. Use of a hand hacksaw.
4. Grind metal parts using a portable grinder (air or electric).
5. Grind the metal parts using a pedestal grinder.
6. Clean metal parts with a power wire brush.
7. Cut metals with a power hacksaw.

IV. OPERATION OF RELATED EQUIPMENT - BEVERLY SHEARS FOR STRIP STEEL

1. Cut strip steel for oxyacetylene welding.

COMBINATION WELDING: DUTY-TASK INDEX

V. OPERATION OF PORTABLE WELDING EQUIPMENT

1. Conduct a daily maintenance check on the equipment.
2. Weld various joints on mild steel in all positions with a variety of electrodes.

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2. Weld lap joints on aluminum with TIG.
3. Weld T-joints on aluminum with TIG.
4. Weld butt joints on steel with TIG.
5. Weld lap joints on steel with TIG.
6. Weld T-joints on steel with TIG.

VII. OPERATION OF M.I.G. WELDING EQUIPMENT

1. Fillet-weld in horizontal position using .035 diameter wire.
2. Fillet-weld in vertical position using .035 diameter wire.
3. Fillet-weld in overhead position using .035 diameter wire.

VIII. OPERATION OF METALLIC ARC-WELDING EQUIPMENT

1. Learn to strike the arc.
2. Run continuous beads.
3. Build up a worn surface (padding).
4. Fillet-weld in horizontal position.
5. Fillet-weld stringer beads in vertical position.
6. Fillet-weld weave beads in vertical position.
7. Fillet-weld in overhead position.
8. Weld a V-groove in vertical position with stringer beads.
9. Weld V-groove in vertical position with weave beads.
10. Weld V-groove in overhead position.
11. Prepare a test plate for guided bend test.
12. Fillet-weld in horizontal position using stainless steel electrodes.
13. Fillet-weld in vertical position using stainless steel electrodes.
14. Build up a surface using stainless steel electrodes.

IX. PERFORM GUIDED BEND TESTS

1. Bend weld samples using hydraulic press.

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TRANSLATED BY

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The preparation of this multicultural series was aided financially through funding agreements with the Illinois State Board of Education/Department of Adult, Vocational and Technical Education.

(Contract Numbers: R-33-10-C-0442-400, R-33-21-J-0542-400)

June 1981

ARDEN L. PRATT, DEAN
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INTRODUCCIÓN

El programa combinado de soldadura continúa por 28 semanas e incluye la soldadura oxiacetilénica, MIG (soldadura de metales en atmósfera de gases inertes), TIG (soldadura con tungsteno en atmósfera de gas inerte), soldadura por arco metálico, corte con soldador de arco, y soldadura "[illegible]r shield." También incluye el uso del equipo portátil de soldadura. La instrucción en soldadura que va incluida 2 horas cada día en las clases de educación conexas o en las clases de Desenvolvimiento General Educativo (G.E.D.). Además hay 6 horas cada día en el taller de soldadura 5 días la semana. Durante las primeras 15-16 semanas, hay una hora de instrucción de taller sobre los principios y las teorías de la soldadura y cuando menos 5 horas de trabajo en el taller cada día.

El rasgo deseable del estudiante de soldadura es la buena salud: las circunstancias ambientales y las actividades arduas del trabajo que se exigen al soldador excluyen a la persona que sufra del asma, que esté malo del corazón o pulmón, o que tenga problemas de la espalda o pierna. El estudiante debe tener una buena coordinación entre el ojo y la mano además de la destreza manual. El soldador necesariamente usa la vista de los dos ojos (los que se pueden rectificar con anteojos).

El estudiante debe darse cuenta de que la soldadura exige que se trabaje en un ambiente sucio, caluroso y algo

incómodo. Sin embargo, el soldador puede esperar ganar más del sueldo medio ($4.50 - $14.00 la hora) después de completar su entrenamiento y con unos cuantos años de experiencia en la tarea.

En el campo de la soldadura, por regla general no hay escala progresiva de paga, especialmente en las minas de carbón y en la industria de construcción. A pesar de la experiencia o la antigüedad, el pago del sindicato prevalece para todos los soldadores que hagan el mismo tipo de trabajo.

La soldadura ha llegado a ser uno de los medios principales de fabricar y reparar los productos metálicos. Es casi imposible citar una industria, grande o pequeña, que no use algún tipo de soldadura. La soldadura ha ayudado a la industria a bajar los costos de producción y a eliminar moldes y operaciones costosas con maquinaria-herramienta.

El soldador competente puede conseguir trabajo en cualquiera de estas actividades: en la industria automovilista, la construcción de edificios y puentes, en los astilleros, en la industria aeronáutica, en la fabricación de aparatos, el mantenimiento del equipo agrícola, de la maquinaria de la industria minero y de la industria petrolera, en los ferrocarriles, etc.

El período de aprendizaje y adestramiento para llenar los requisitos de trabajar como soldador varía de unos meses de entrenamiento en el lugar de trabajo a unos años de entrenamiento formal. Por lo general se requieren un conocimiento de las propiedades de los metales, una comprensión de las

copias heliográficas y de los símbolos de soldadura, y un dominio de las técnicas de soldadura.

Unos años de experiencia después de un curso de soldadura es el procedimiento usual de aprender el oficio. El novicio empieza con tareas simples de producción y mientras su experiencia y habilidad se mejoran, se avanza a niveles más altos.

Para conseguir un empleo mejor pagado en que la calidad y resistencia de la soldadura son críticas, especialmente en las minas de carbón y en la construcción, el soldador debe pasar un examen de certificación o de ejecución. El empleador o las autoridades de inspección administran este examen. No hay empleo de principiante en las minas de carbón o en la construcción. Desde el día de conseguir el trabajo el soldador debe soldar al nivel de los otros soldadores.

Cualquiera con buena coordinación entre el ojo y la mano puede aprender a soldar sin saber leer. Sin embargo, el soldador diestro que lee bien y que tiene diploma de escuela de segunda enseñanza tendrá la oportunidad de avanzar al puesto de inspector, jefe de grupo, o supervisor.

COMBINATION WELDING: DUTY-TASK INDEX

RELACIÓN DE DEBERES Y TRABAJOS DE SOLDADURA AUTÓGENA

I. OPERACIÓN DEL EQUIPO OXIACETILÉNICO

1. Armar el equipo portátil o estacionario (fijo) oxiacetilénico.
2. Revisar (checar) el equipo para averiguar si hay fugas.
3. Cambiar botellas de gas.
4. Correr un cordón o costura sobre una hoja de acero sin varilla de aportación.
5. Correr el cordón sobre una hoja de acero con varilla de aportación.
6. Soldar juntas en traslapo sobre una hoja de acero en posición plana.
7. Soldar juntas-tope en hojas de acero en posición plana.
8. Soldar juntas-T en una hoja de acero en posición horizontal.
9. Soldar juntas en traslapo en una hoja de acero en posición horizontal.
10. Soldar juntas-tope en traslapo en una hoja de acero en posición horizontal.
11. Soldar juntas en posición vertical empleando hoja de acero.
12. Soldar juntas en traslapo en hoja de acero en posición vertical.
13. Soldar juntas-T en hoja de acero en posición vertical.
14. Soldar una junta en traslapo en lo alto por encima de la cabeza.
15. Soldar juntas-T en lo alto por encima de la cabeza.
16. Soldar juntas-tope en lo alto.
17. Cortar acero al carbono con un soplete cortador.
18. Reparar hierro fundido soldándolo con bronce (latón). (soldadura fuerte)
19. Soldar un metal ferroso con soldadura de plomo y estaño.
20. Soldar un metal ferroso con soldadura de plata.

II. OPERACIÓN DE UN SOPLETE OXIACETILÉNICO EN CARRITO-GUÍA

1. Hacer cortes en línea recta empleando un soplete montado en carrito-guía.
2. Hacer cortes en bisel a un ángulo de 30° con el soplete montado en carrito-guía.

COMBINATION WELDING: DUTY-TASK INDEX

RELACIÓN DE DEBERES Y TRABAJOS DE SOLDADURA AUTÓGENA

III. OPERACIÓN DE EQUIPO AFÍN A LA SOLDADURA

1. Emplear un juego de aterrajar (terraja y macho correspondiente) para hacer rosca interna.
2. Taladrar (barrenar) piezas metálicas con equipo mecánico (taladradora de fuerza).
3. Emplear una sierra de arco (para metales).
4. Esmerilar (amolar) piezas (de maquinaria) empleando equipo eléctrico).
5. Esmerilar piezas metales empleando esmeriladora de pedestal.
6. Limpiar piezas metales con cepillo de alambre mecánico.
7. Cortar metales con una sierra mecánica.

IV. OPERACIÓN DE EQUIPO AFÍN - TIJERAS BEVERLY PARA CORTAR ACERO EN TIRAS

1. Cortar acero en tiras para la soldadura oxiacetilénica.

V. OPERACIÓN DE EQUIPO PORTÁTIL DE SOLDADURA

1. Llevar a cabo una revisión diaria del equipo para su mantenimiento.
2. Soldar varias juntas sobre acero parco en carbono en todas las posiciones y con una variedad de electrodos.

VI. OPERACIÓN DEL EQUIPO DE SOLDAR TUNGSTENO EN ATMÓSFERA DE GAS INERTE (ATCAGI)

1. Soldar juntas en tope en el aluminio empleando el arco de tungsteno con atmósfera de gas inerte (ATCAGI.)
2. Soldar juntas en traslapo en el aluminio con ATCAGI.
3. Soldar juntas en T en el aluminio con ATCAGI.
4. Soldar juntas en tope en el acero con ATCAGI.
5. Soldar juntas en traslapo en el acero con ATCAGI.
6. Soldar juntas en T en el acero con ATCAGI.

VII. EMPLEO DEL EQUIPO DE SOLDADURA DE METALES EN ATMÓSFERA DE GASES INERTES (MAGI)

1. Soldadura en filete en posición horizontal empleando alambre de diámetro de .035.

COMBINATION WELDING: DUTY-TASK INDEX

RELACIÓN DE DEBERES Y TRABAJOS DE SOLDADURA AUTÓGENA

VII. EMPLEO DEL EQUIPO DE SOLDADURA DE METALES EN ATMÓSFERA DE GASES INERTES (MAGI) - (cont.)

2. Soldar en filete en posición vertical empleando alambre de diámetro de .035.
3. Soldadura en filete encima de la cabeza empleando alambre de diámetro de .035.

VIII. OPERACIÓN DEL EQUIPO SOLDADOR CON ARCO METÁLICO

1. Aprender a pegar el arco.
2. Correr costuras en serie.
3. Revestir una superficie desgastada; hacer el almohadillado.
4. Soldadura en filete en posición horizontal.
5. Soldadura en cordoncillo en posición vertical.
6. Soldadura en cordón entretejido en posición vertical.
7. Soldadura en filete encima de la cabeza.
8. Soldar una ranura-V en posición vertical haciendo (formando) el cordoncillo de rigor.
9. Soldar ranura-V en posición vertical con cordón entretejido.
10. Soldar ranura-V encima de la cabeza.
11. Preparar una placa de prueba, para la prueba de torsión.
12. Soldar en filete en posición horizontal empleando electrodos de acero inoxidable.
13. Soldar en filete en posición vertical empleando electrodos de acero inoxidable.
14. Revestir una superficie empleando electrodos de acero inoxidable.

IX. LLEVAR A CABO PRUEBAS GUIADAS DE TORSIÓN

1. Torcer muestras de soldadura empleando la prensa hidráulica.

INTRODUCTION TO COMBINATION WELDING

LAOTIAN VERSION

CAREER DEVELOPMENT CENTER
SCHOOL OF TECHNICAL CAREERS
SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMPETENCY-BASED VOCATIONAL/TECHNICAL CURRICULUM SERIES

INTRODUCTION TO COMBINATION WELDING

LAOTIAN VERSION

MASAKO T. SHIN, CURRICULUM SPECIALIST, STC, SIU-C

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LARRY HEPBURN, CENTER DIRECTOR

June 1981

คำนำ.

หลักสูตรของการเรื่องโลหะ หายระบบไว้เวลา 28 อาทิต. ก่อนกับการเรื่องโลหะ โดยไว้ทาส Oxyacetylene, TIG, MIG. การตัดโลหะโดยไว้ประกายไฟฟ้า และการเรื่องโดยไว้เคื่องป้องกัน ลวงหัวการไว้เคื่องเรื่องโลหะ จะมีดเอ้าเคื่องไปมาได้. การชุมของการเรื่องโลหะ จะไว้เวลา 2 รั่วโมงต่ำมีชุม ก่อนกับวิจาที่ก่อนกับการเรื่องโลหะ และการตามตัว เพื่อจะสอบเสังหวย มักยังตอบปาย. และอีก 6 รั่วโมงไว้ในการฝึกสอบการเรื่องโลหะ การชุมมี 5 มีต่ำอาทิต. (ในละห่วง 15 หรือ 16 อาทิตทำอีก จะมีการสอบก่อนกับทิตสะดี ควบกับพาทปะติบัต และส่วนเหลือนั้นจะเพิ่มเป็นพาทปะติบัตล้วม).

ลักษะนะที่ดีของมัตชุมจะต้องเป็นคันที่มีสุขพาบดี. เนื่องจากสิ่งแวดล้อม และทัพจาดของวงกงานสามาตคัดคันที่มีสุขพาบบ่ดีออกจากวงกงาน ถ้าหากว่าจ่างเรื่องโลหะมีบันหาทางด้านการหายใจ, หัวใจ และปอด ตลอดจันเฉิงหัง และกาของร่างกายบ่ค่อยดี. มัตชุมที่จะได้รับการฝึกจะต้องมีสายตาดี และมีความสามาตในการไว้มี.

มัตชุมจะต้องมีความเข้าใจว่าการเรื่องโลหะจะต้องเรัดในบ่อนร้อน และสักปีก และร้อนร้างละบ่สะบายกาย.

ຢ່າງໄດ້ຕາມ, ຖ້າງເຊື່ອມຈົດນະ: ສາມາດຫາລາຍໄດ້ສູງກວ່າລາຍຈ່າຍ ຂອງຄ່າຈ້າງ ($4.50 - $14.00) ຫລັງຈາກສຳເລັດການສອນຂອງ ສູ ແລະ ມີຄວາມສາມາດ 2 ຫຼື 3 ປີຂຶ້ນໄປ.

ຈົນການເຊື່ອມຈົດນະ: ຈົດຈະເຜາະ: ວຽກງານທີ່ເຮັດເນື້ອງຫຸ້ມ ຫໍ່ ເຮັດ: ວຽກການຕ່ຳສັ້ງ ຄ່າຈ້າງຈະບໍ່ເພີ່ນຂຶ້ນຕົ້ນເຮວ ການເປັນ ປີທີ່ເຮັດວຽກມາ. ບໍ່ວ່າຈະມີຄວາມສາມາດ ຫຼື ເຮັດວຽກ ມາດົນກ່ວ ການ, ອັດຕາຄ່າເຮງງານຂອງ ນະ: ພາຍແຮງງານ ຈະເທົ່າກັນ ໝົດ ສຳລັບ ວຽກງານ ທີ່ ເຊື່ອມຈົດນະ: ຢ່າງດຽວກັນ.

ການເຊື່ອມຈົດນະ: ເປັນວິທີການ ທີ່ ສຳຄັນ ຫຼາຍ ຈົນການ ສ້ານ ຫຼື ສ່ອມແປງ ສິ່ງ ຂອງ ທີ່ ເປັນ ໂລຫະ. ເກືອບ ຈະ ເປັນ ໄປ ບໍ່ ໄດ້ ເລີ ຍ ທີ່ ຈະ ຫາ ອຸດ ສາ ຫະ ກັ ນ ອັ ນ ໄດ ອັ ນ ນຶ່ ງ ບໍ່ ວ່ າ ຈະ ຈິ ດ ຫ ລ ວ ຍ ຫຼ ື ນ ້ ອ ຍ ທ ີ່ ຈ ະ ບ ໍ່ ໄ ດ ້ ນ ຳ ເ ອ ົ າ ເ ຊ ື ່ ອ ມ ຈ ົ ດ ນ ະ: ຢ ່ າ ງ ໄ ດ ຢ ່ າ ງ ນ ຶ ່ ງ. ການ ເ ຊ ື ່ ອ ມ ຈ ົ ດ ນ ະ: ໄ ດ ້ ຊ ່ ວ ຍ ອ ຸ ດ ສ າ ຫ ະ ກ ັ ນ ທ ີ ດ ຄ ່ າ ນ ຳ ຈ ່ າ ຍ ຈ ົ ດ ນ ະ ມ ້ ອ ຍ ລ ົ ງ ຈ ິ ດ ຈ ະ ການ ອອ ກ ແ ບ ບ ຈ ິ ດ ງ ່ າ ຍ ລ ົ ງ ຈ ະ ໄ ດ ້ ທ ີ ດ ຄ ່ າ ແ ຮ ງ ງ ານ ແ ລະ ຄ ່ າ ທ ີ ່ ຂ ອ ງ ຈ ິ ດ ນ ະ: .

ຖ້ າ ເ ຊ ື ່ ອ ມ ຈ ົ ດ ນ ະ ທ ີ ດ ີ ສ າ ມ າ ດ ຫ າ ວ ຽ ກ ຈ ົ ດ ນ ະ: ຫ ຼ າ ມ ທ ີ ເ ລ ີ ່ ມ ນ ຳ ໄ ດ ້ ເ ກ ືອ ບ ລ ວ ມ ຫ ລ າ ຍ ບ ່ ອ ນ: ອ ຸ ດ ສ າ ຫ ະ ກ ຳ ສ ້ ານ ລ ົ ດ, ການ ຕ ່ ຳ ສ ້ ານ ຕ ິ ດ, ອ ຸ ສ າ ຫ ະ ກ ຳ ເ ຄ ື ່ ອ ງ ຈ ັ ກ, ເ ຮ ືອ, ອ ຸ ປ ະ ກ ອ ນ, ຈ ິ ດ ງ ານ ລ ົ ດ ເ ຄ ື ່ ອ ງ ໄ ຟ, ເ ຄ ື ່ ອ ງ ມ ື ເ ຮ ັ ດ ໄ ຮ່ ມ າ, ເ ຫ ລ ັ ກ, ເ ຄ ື ່ ອ ງ ຈ ັ ກ ນ ້ ຳ ມ ັ ນ, ລ ົ ດ ໄ ຟ ແ ລ ະ ອ ື ່ ນ ໆ.

ການ ປ ຸ ກ ຈ ິ ດ ສ ຳ ນ ຶ ກ ຂ ອ ງ ຄ ວ າ ມ ສ ຳ ຄ ັ ນ ຂ ອ ງ ຄ ວ າ ມ ສ າ ມ າ ດ ຂ ອ ງ ວ ິ ຊ າ ຊ ີ ບ ເ ພ ື ່ ອ

จะได้เว้าเรื่องวงศ จะคืนปู่ทับความต้องการของแต่ละวงศงานที่จะเว้าไปเรื่อง เสิ้มจากการฝึกหอมของหามเดือน จับเหิงของหามปี มักรวมมีความต้องการที่จะรวมรู้ความรู้ต่างทับคุมหัมบัดของโลหะ, การอ่านแบบแปลม, เคื่องหายที่ไว้ต่างทับการเรื่องโลหะในแปลม พ้อมทั้งความหามาดในวิธีการเรื่องโลหะอย่างดี.

หัตถุดของการเรื่องโลหะที่มักรวมได้ผ่านการฝึกหอมมาจะต้องติดตามไปด้วยปะหัยปะการอีกหายปี จับก่อนจะรู้เหิงวิธีเจ้าทางเรื่องโลหะแท้จริง. วงศจะเลิ้มตั้มด้วยวงศผะลิดคืนง่ายๆ แล้วจะค่อยๆ ยากคืนปู่ทับความหามาด และสำนานของช่างเรื่องโลหะ.

การที่จะได้รับค่าจ้างที่หูๆ ช่างเรื่องโลหะจะต้องหอยเหิงติดลองต่างทับการสะแดงฝีมื และทวดหอยโดยผู้ช่วยงานทางมีโดยทิง. ก่อนที่เว้าจะให้ทั้งสี่ธัยรอง การทวดหอยจะแพ่งเล่งปู่ทับคุมพาย และความแรงแรงของการเรื่องโดยสะเพาะวงศเรื่องโลหะบ่อนเหมืองหุ่นหิน. เหมืองหุ่นหิน เว้าจะบ่ธัยคัมงานเรื่องโลหะที่เลิ้มตั้มเลือ คัมที่ได้เว้าเรื่องวงศจะเลิ้มเรื่องโลหะได้เหมือนคัมงานช่างเรื่องโลหะอื่นๆ.

ในการที่มีความหุมัดในการไว้มี จะรวมเรื่องโลหะ

COMBINATION WELDING: DUTY-TASK INDEX

ຈາລະບານ: ໜ້າທີ່ ແລະ ການງານ ຂອງການ ເຊື່ອມ ໂລຫະ ຕ່າງ ໆ.

I. OPERATION OF OXY-ACETYLENE EQUIPMENT ການ ໄຊ້ ເຄື່ອງ ມື Oxy-Acetylene ສຳ ລັບ ເຊື່ອມ ໂລຫະ.

1. ການ ປະ ກອບ ເຊື່ອມ ໂລຫະ Oxy-Acetylene ຊະ ນິດ ຕັ້ງ ຢູ່ ກັບ ບ່ອນ ຫຼື ຊະ ນິດ ເລື່ອນ ໄປ ມາ ໄດ້.
2. ກວດ ເບິ່ງ ວ່າ ເຄື່ອງ ມື ຮົ່ວ ຫຼື ບໍ່.
3. ປ່ຽນ ຫຼັ ອັດ ຂອງ ກົ້າດ.
4. ການ ເຮັດ ໃຫ້ ອັນ ເຊື່ອມ ເປັນ ຮູ ເພື່ອນ ຕັດ ປາ ໂດຍ ບໍ່ ຕ້ອງ ໄຊ້ ເຫັກ ເຊື່ອມ ເຍບ ອັນ ເຊື່ອມ ເພັ້ນ ເຕັ້ນ (Filler rod).
5. ການ ເຊື່ອມ ແຜ່ນ ເຫຼັກ ໂດຍ ໄຊ້ Filler rod.
6. ເຊື່ອມ Lap-Joints ຂນະ ນອນ ຮາບ ກັບ ພື້ນ.
7. ເຊື່ອມ Butt Joints ຂນະ ນອນ ຮາບ ກັບ ພື້ນ.
8. ເຊື່ອມ T-Joints ຫາງ ນອນ.
9. ເຊື່ອມ Lap Joints ຫາງ ນອນ.
10. ເຊື່ອມ Butt Joints ຫາງ ນອນ
11. ເຊື່ອມ Butt Joints ຫາງ ຕັ້ງ.
12. ເຊື່ອມ Lap Joints ຫາງ ຕັ້ງ.
13. ເຊື່ອມ T-Joints ຫາງ ຕັ້ງ.
15. ເຊື່ອມ T-Joints ແບບ ເຫົ່ງ ຫົວ.
16. ເຊື່ອມ Butt Joints ແບບ ເຫົ່ງ ຫົວ.
17. ຕັດ ແຜ່ນ ເຫຼັກ ດ້ວຍ ຫົວ ເຊື່ອມ.
18. ສ່ອມ ແປງ ເຄື່ອງ ເຫຼັກ ຫຼອມ ດ້ວຍ ການ ໄຊ້ ຫອງ ແດງ ເຊື່ອມ.
19. ເຊື່ອມ ກົ່ວ ຫັບ ເຫຼັກ.
20. ເຊື່ອມ ເງິນ ປະ ສົມ ກົ່ວ.

II. OPERATION OF OXY-ACETYLENE TRACK TORCH ການນຳໃຊ້ເຄື່ອງມືສຳລັບເຊື່ອມ Oxy-Acetylene Track Torch.

1. ການນຳໃຊ້ Track Torch ຕັດແຜ່ນເຫຼັກຫາງເສັ້ນຊື.
2. ການນຳໃຊ້ Track Torch ຕັດເປັນມຸມ 30°.

III. OPERATION OF RELATED EQUIPMENT ການນຳໃຊ້ເຄື່ອງມືທີ່ຫຼາກຫຼາຍກັບເຄື່ອງເຊື່ອມ.

1. ການນຳໃຊ້ເຄື່ອງມືຕັດຫຼາວເປັນຈຸດ ສຳລັບຫຼາວສັ່ງຈົມ.
2. ເຄື່ອງແຜ່ນເຫຼັກ ດ້ວຍສະວ່ານໄຟຟ້າ.
3. ການນຳໃຊ້ເລື່ອຍມື.
4. ການຝົນວັດຖຸທີ່ເປັນຈົນຫະ ໂດຍນຳໃຊ້ເຄື່ອງຝົນຈະນະນິດຕັ້ງຕົດກັບພື້ນທີ່ນຳໃຊ້ໄຟຟ້າ ຫຼື ກຳລັງລົມ.
5. ການຝົນວັດ ທີ່ເປັນຈົນຫະ ໂດຍເຄື່ອງຝົນຈະນະນິດ ຕັ້ງຕົດຢູ່ກັບພື້ນ.
6. ທຳຄວາມສະອາດວັດຖຸ ຍ້ອນ ຕອນ ຂ້ອນ ເປັ່ງ ເຫຼັກ ເປັນ ເສັ້ນ ລວດ.
7. ຕັດຈົນຫະ. ດ້ວຍ ເລື່ອຍ ໄຟ ຟ້າ.

IV. OPERATION OF RELATED EQUIPMENT/BEVERLY SHEARS FOR STRIP STEEL ການນຳໃຊ້ເຄື່ອງມືທີ່ຫຼາກຫຼາຍ ກັບ ເຄື່ອງ ເຊື່ອມ ການນຳ ໃຊ້ ເຄື່ອງ ຕັດ ເຫຼັ້ມ ນ້ອ ຕັດ ຈາ Beverly Shears ສຳ ລັ ບ ຕັ ດ ເ ຫ ຼ ັ ກ ຍ າ ວ.

1. ການ ຕັ ດ ເ ຫ ຼ ັ ກ ທ ອ ມ ຍ າ ວ ສຳ ລ ັ ບ ການ ເ ຊ ື ່ ອ ມ ໂ ດ ຍ ນ ຳ ໃ ຊ ້ Oxy-Acetylene.

V. OPERATION OF PORTABLE WELDING EQUIPMENT ການນຳ ໃ ຊ ້ ເ ຄ ື ່ ອ ງ ເ ຊ ື ່ ອ ມ ຈ ິ ດ ສ ະ ນ ະ ນິ ດ ເ ຄ ື ່ ອ ນ ທ ີ ່ ໄ ດ ້.

1. ການ ຫ ວ ດ ຮ ຽ ບ ເ ຄ ື ່ ອ ງ ມ ື ປ ະ ຈ ຳ ວ ັ ນ.
2. ການ ເ ຊ ື ່ ອ ມ ເ ຫ ຼ ັ ກ ອ ອ ມ ຫ ລ ຸ ດ ແ ຍ ບ ແ ລ ະ ຫ ລ ຸ ດ ສ ະ ຫ ຼ າ ມ ທ ີ ່ ຂ ້ ອ ນ ເ ສ ັ ້ ນ ລ ວ ດ Electrodes ຕ່ າ ງ ໆ.

VI. OPERATION OF PORTABLE WELDING EQUIPMENT ภาษาไว้เครื่องเชื่อม ว.มิด Tungsten Inert Gag (T.I.G).

1. เชื่อม Butt Joints เชิงอะลูมิมงมด้วย TIG.
2. เชื่อม Lap Joints เชิงอะลูมิมงมด้วย TIG.
3. เชื่อม T-Joints เชิงอะลูมิมงมด้วย TIG.
4. เชื่อม Butt Joints เชิงเหล็กด้วย TIG
5. เชื่อม Lap Joints เชิงเหล็กด้วย TIG.
6. เชื่อม T-Joints เชิงเหล็กด้วย TIG.

VII. OPERATION OF M.I.G. WELDING EQUIPMENT ภาษาไว้เครื่องเชื่อม ว.มิด M.I.G.

1. ภาษาเชื่อมเหล็กของแผ่นเป็นมุมฉากให้ติดกัน (Fillet Weld) โดยภาษาไว้เส้นลวด Electrode ขนาดเส้นผ่าสูมทาง .035 ในทางมอบ.
2. ภาษาเชื่อม Fillet Weld โดยไว้เส้นลวดขนาดเส้นผ่าสูมทาง .035 ในทางตั้งขึ้น หรือ ลิง.
3. ภาษาเชื่อม Fillet Weld โดยไว้เส้นลวดขนาดเส้นผ่าสูมทาง .035 ระยะเชิงหัว.

VIII. OPERATION OF METALLIC ARC-WELDING EQUIPMENT ภาษาไว้เครื่องมือเชื่อมไฟฟ้า Arc-Welding.

1. ปรับรู้ภาษาจุดประกายไฟของปายเชื่อม.
2. ภาษาเชื่อมให้เป็นรอยติดต่ำกัน.
3. ภาษาเชื่อมใกล้ให้จับเชิงบ่อนที่ลุ้ย.
4. เชื่อม Fillet Weld ทางมอบ.
5. เชื่อม Fillet Weld เป็นเส้นทางตั้งขึ้น - ลิง.
6. เชื่อม Fillet Weld ให้ม้วนรอยๆ เป็นเส้นทางตั้งขึ้น - ลิง.

Technical Lexicon:

English
English/Spanish
English/Laotian

CE029 PD#2

COMBINATION WELDING TECHNICAL TERMS

CAREER DEVELOPMENT CENTER
SCHOOL OF TECHNICAL CAREERS
SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMBINATION WELDING TECHNICAL TERMS

MASAKO T. SHIN, CURRICULUM SPECIALIST, STC, SIU-C

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ARDEN L. PRATT, DEAN
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LARRY HEPBURN, CENTER DIRECTOR

June 1981

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WELDING: Technical Terms - Equipment

air grinder: a type of portable grinder that requires the air-compressor to drive the motor.

brush, wire: a type of brush used in welding to brush the slag out of the way. It has wire bristles.

cable: It connects the electrode holder to the power supply and the ground clamp to the power supply. It is a rubber-covered, multi-strand copper wire.

C-clamp: a tool used to reinforce or to keep something in alignment until the welding can be done.

cutting head: the apparatus that changes a regular gas torch into a cutting torch with which the welder cuts the metal.

electrode holder: the piece of equipment that holds the electrode; it is often called a "stinger."

gloves, gauntlet: gloves designed for welder's use: long heavy gloves made out of materials such as leather, canvas, asbestos, etc.

ground clamp: a clamp or clip used to form the grounding connection in arc welding; like a welding cable, it is a rubber-covered, multi-strand copper wire.

hammer, chipping: a type of hammer especially designed for chipping slag off a weld: One end is long and pointed, and the other end has a sharp, flat end.

helmet: a protective shield to protect eyes, face and throat areas from arc rays, sparks and spatter.

hose: the flexible tubing used to supply the gas to the welding or cutting torch.

lens, clear: a cheaper clear plastic lens used to protect the filter lens from being damaged.

lens, filter: a colored glass used in goggles, helmets, and shields to exclude harmful arc rays.

lighter spark: See "striker."

WELDING: Technical Terms - Equipment (cont.)

orifice: The end of a cutting torch has a number of pre-heat holes beside the actual cutting oxygen hole. These holes are called orifices.

regulator: a device used on gas cylinders to control the amount of gas that comes out of the cylinder and to give a steady even flow.

safety glasses: plain, clear glasses worn as a protection to the eyes while welding or grinding.

stinger: a welder's slang for the electrode holder.

striker or spark lighter: a device used to ignite (light) the gas from a welding torch.

tip: the part of the torch from which the gas is discharged, sometimes called a nozzle: The diameter of its opening determines the size of the tip. Sizes range from 0 to 15.

vise grip: a tool similar to the locking pliers used to keep the pieces in alignment until the welding can be done.

whip: a welder's slang for the electrode holder and the small cable attached to it. It is a light-weight piece of equipment that a welder may carry around with him.

WELDING: Technical Terms

a.c.: Alternate current refers to the electric power that comes from the power company. It changes from positive to negative at the rate of 60 times per second.

acetylene gas: used in gas welding together with oxygen; produces one of the highest flame temperatures obtainable (6,300°F) which readily melts the steel for fusion welding.

air-cooling: a treatment to a metal when a hot metal is allowed to cool on its own instead of quenching.

alloy: a mixture of two or more metals.

amperage: a unit of measurement for a current flow: In welding, the more amperage the welder has, the hotter the arc will be.

annealing: a softening process which allows metal to be more readily machined and also eliminates stress in metal after it is welded.

anvil: a heavy block of steel or iron for use as a hammering or forging work surface.

arc: the flow of electricity through the air which produces high temperatures; the arc originates from the welding electrode and ends at the base metal.

arc air-cutting: cutting metal by means of an electric arc using carbon electrodes, then blowing the molten metal away with compressed air.

arc blow: the tendency for an arc to wander or whip from its normal course during arc welding.

arc length: the distance from the end of the electrode to the base metal.

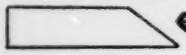
argon gas: a colorless inert gas used in welding to protect the molten metal from the harmful atmospheric elements; used to weld aluminum.

base metal: the metal to be welded.

WELDING: Technical Terms (cont.)

bend test: a physical test performed on the weld samples to judge the quality of the weld.

bevel: a cut into the metal that is done on a slant:



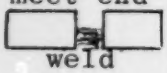
blower: a big exhaust system used to suck out all the welding fumes and smoke.

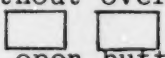
blowholes: cavities caused by the gas trapped in metal during the solidification of the weld metal.

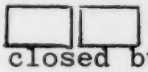
blueprint: a photographic copy of an original drawing: In welding, the blueprint tells the welder what size and shape to weld the part.

bolt: a round metal rod, with a head, that is threaded to receive a nut:

butt joint: a joint in which the edges of the two metals meet end to end without overlap:







case hardening: a process of hardening low-carbon or mild steel by adding carbon to the outer surface: forming a hard, thin outer shell.

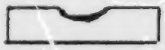
cast iron: an iron-based material with a high percentage of carbon: very brittle and hard to weld because it cracks easily.

chamfer: a cut into the metal that is done on a slant just as a bevel, but the end is left squared off:

circuit breaker: a safety device in the form of a relay which opens the circuit in case of an overload: A circuit breaker does not have to be replaced when blown, only to be reset.

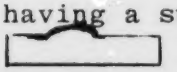
circumference: the distance around a circle; the perimeter of a circle.

WELDING: Technical Terms (cont.)

concave: a curved depression: 

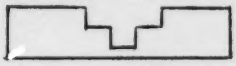
conductor: any material in a form of a wire-cable or bar which allows free passage of an electric current.

convex: having a surface with an outward curve:

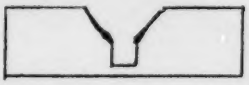


corrosion: the wasting away of metal due to various atmospheric conditions.

counterbore: to drill a second larger hole using the same center as the original hole to a specific depth:



countersink: to shape a hole drilled with a cone-shaped tool to provide a recess for a flat-head screw or bolt:



crack (tank valves): a quick open/shut motion to make sure there is no obstruction in valves.

crater: a depression in the face of a weld, usually at the termination of an arc weld.

cover pass: the final pass made in any multiple-pass fillet.

d.c.: Direct current refers to the electricity found in batteries, which can be transformed from a.c. It is either positive or negative, depending on the direction the current is traveling.

diameter: the length of a line drawn through the center of a circle and terminating at the circumference on each end.

ductility: the ability of a metal to stretch, bend or twist without breaking or cracking.

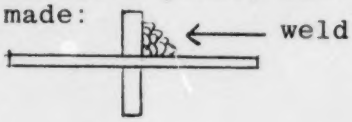
electrode: thin metal wire coated with a special substance and used as filler to join the metal to be welded.

WELDING: Technical Terms (cont.)

ferrous metals: those metals that have iron-based compounds.

filler rod: metal wire that is melted and added to the welding puddle to produce the necessary bead thickness.

fillet: similar to the T-joint, but in this case more than one pass is made:



flash: the impact of electric arc rays against the human eye.

flat joints: any of the welding joints done in the flat position of the metal.

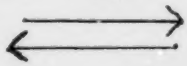
flux: chemicals used in welding and soldering to promote better fusion; also used as a cleaning agent around the weld area.

fuse: a safety device which opens or burns into when an electric circuit is overloaded. (e.g., Too many appliances are in use at the same time.)

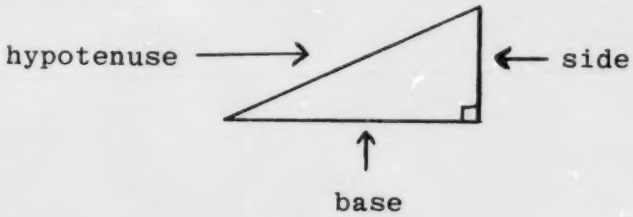
fuse box: a central location where all the fuses are located for all the circuits in the building.

hard surfacing: a process of applying a hard wear-resistant layer of metal to the surface or the edges of worn-out parts.

horizontal: parallel to the horizon: moving in an across motion from left to right or vice versa (from right to left):



hypotenuse: the side of a right-angled triangle opposite the right angle; the longest side of a right-angled triangle:

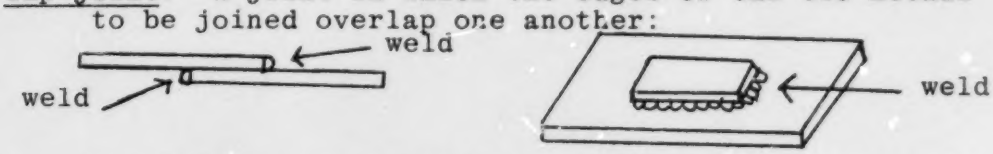


WELDING: Technical Terms (cont.)

infrared ray: heat rays that are produced by welding; can burn eyes and skin if not covered during the welding process.

joints: See "butt joints," "lap joint," "T-joint," "flat joint," and "fillet."

lap joint: a joint in which the edges of the two metals to be joined overlap one another:



M.I.G. welding: an abbreviation for Metal Inert Gas welding; a type of welding in which the arc is surrounded by a gas which keeps the atmosphere away, preventing its reaction with electrode or base metal.

MIG wire: a bare-solid wire which feeds off a spool to prevent unnecessary starting and stopping.

molten metal: a condition of a metal when it is heated to the point that it melts and becomes a fluid.

non-ferrous metal: those metals that do not contain iron compounds: non-ferrous metals do not rust.

nut: a small metal block in a variety of shapes, which is drilled and internally threaded to match a bolt.

ohm: a unit of measurement for resistance: Zero ohm means no resistance, or a closed circuit.

overlap: a condition in which the weld-metal is lying on top of the base metal and not fused together properly; may be caused by too low an amperage.

oxygen gas: readily supports combustion, accelerating the temperature when mixed with acetylene.

padding: a process of building up the worn surface of shafts, wheels, and other parts. The operation consists of depositing several layers of beads one at a time on top of the other.

pass, root: the first pass or bead placed in a fillet weld.

pass, filler: the pass or passes after the root pass.

WELDING: Technical Terms (cont.)

pass, cover: the final pass used to give a good appearance and an extra reinforcement to the weld.

penetration: the extent the fusion goes into the base metal; how deep the weld is to dig into the base metal.

polarity: indicates the direction of the electric current in a circuit.

porosity: the formation of tiny pinholes generated by atmospheric contamination.

postheating: heating the base metal after it has been welded.

preheating: heating the metal to be welded as a preparation to prevent cracking.

quenching: a treatment to a metal when a hot metal is cooled by a sudden submersion into a liquid solution such as water, oil, etc.

radius: a welder's expression to round off the corner of a piece of metal to eliminate the sharp edges.

ripple: shape of the deposited bead that is caused by movement of the electrode.

ripple beads: This term refers to the appearance of the bead. The bead should have nice even, semicircular lines on a convex surface:

slag: the protective covering that is removed from a weld after it has cooled.

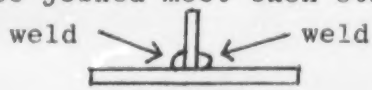
solder: an alloy of tin and lead used to bond two surfaces together; uses low heat and does not fuse the two metals together, but merely sticks to the surface.

solidify: a term used when a molten metal is allowed to become solid.

stress: the internal resistance of a material against a change or deformation.

WELDING: Technical Terms (cont.)

T-joint: a joint in which the edges of the two metals to be joined meet each other at a 90° angle:



tack or tack weld: a shallow, temporary weld to hold metal in alignment:

tensile strength: a maximum pull stress in P.S.I,; in welding, the amount of pull it takes to pull a weld apart.

tolerance: the amount of variation (difference) or error allowed in the size in welding a part.

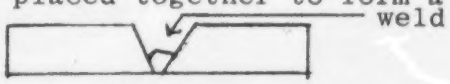
torch: a mechanism the welder uses during gas-welding and cutting: At the end of the torch, the gas is burned to perform various gas-welding and cutting operations.

track torch: same as torch, except the torch is mounted on a motor-driven device which runs on a track to produce straight or angular cuts.

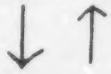
travel speed: the speed in which the puddle or molten metal is moved along.

undercut: a depression in a weld which is below the surface of the base metal: This condition usually occurs due to excessive amperage.

vee-butt: a butt joint where two pieces of metal are placed together to form a "V":



vertical: a perpendicular to the horizon; moving from a down-position (bottom) to an up-position (top) in a straight line, or vice versa:



voltage: a force that causes free electrons to flow in a circuit: In welding, the voltage is adjusted with the amperage to provide a steady arc.

WELDING: Technical Terms (cont.)

voltage drop: a condition that happens when the voltage must travel a long distance: There will be higher voltage at the start than at the end of the cable. In welding, the voltage drop is dealt with by increasing the amount at the beginning to compensate for the loss.

weld bead: the ridge formed at a welding joint, resulting from fusion and addition of welding rod: After the welding process is completed, the weld-metal placed on a base-metal is called a weld bead.

weld puddle: a portion of a weld that is molten at the place where the heat is applied.

COMBINATION WELDING TECHNICAL TERMS

ENGLISH-SPANISH LEXICON

CAREER DEVELOPMENT CENTER
SCHOOL OF TECHNICAL CAREERS
SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMBINATION WELDING TECHNICAL TERMS

ENGLISH-SPANISH LEXICON

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COMBINATION WELDING: Equipment and Tools

SOLDADURA: Equipo y herramientas

air grinder: Máquina amoladora impulsada por aire: Una máquina amoladora (esmeriladora) que utiliza el compresor de aire para impulsar su motor.

brush, wire: cepillo de alambre: un cepillo empleado por el soldador para limpiar la escoria. En vez de cerdas naturales está hecho de alambres tiesos, comúnmente de acero, pero a veces de latón.

cable: cable: Se emplea para traer al encaje del electrodo la corriente eléctrica e igualmente para conexión de la mordaza de tierra al fuente de la corriente. Los cables están cubiertos de hule (caucho) y son de múltiples alambres de cobre.

C-clamp: Tornillo en C: Un dispositivo empleado para reforzar o mantener en su lugar (en alineamiento) el objeto a soldar hasta que se suelde.

cutting head: boquillo cortador: el tipo de boquillo de soplete de gas para convertirlo en cortador de metal.

electrode holder: encaje de electrodo: el dispositivo que sirve para contener o mantener el electrode en la posición necesaria para poder emplearlo en la soldadura; en el lenguaje común de taller le dicen a menudo "el aguijón" (stinger).

gloves, guantlet: guantes de soldador: guantes hechos para el uso del soldador: largos para cubrir una parte del antebrazo, y hechos de piel, lienzo con asbesto, etcétera.

ground clamp: mordaza de tierra: un tornillo de mano o mordaza que se usa para hacer la conexión de tierra en la soldadura de arco. Igual que cable del soldador está cubierto de hule (caucho).

hammer, chipping: martillo de desbastar: un martillo de diseño especial para desbastar la escoria de la soldadura: un extremo es largo y puntiagudo, y el otro es plano y agudo.

helmet: pantalla de cabeza: un escudo protector para resguardar los ojos, la cara, y la zona de la garganta de los rayos y centellas del arco, y de las salpicadas de metal.

hose: manguera: el tubo flexible empleado para surtir de gas el soplete para soldar o cortar.

COMBINATION WELDING: Equipment and Tools

SOLDADURA: Equipo y herramientas

lens, clear: lente, sin colorido: un lente corriente de plástico que se emplea para proteger el lente filtrador.

lens, filter: lente filtrador: vidrio con colorido que se emplea en los anteojos, escudos de mano o de cabeza para excluir los rayos dañosos del arco.

lighter spark: ver "striker".

orifice: orificio: La boquilla del soplete de cortar tiene varias aperturas para pre-calentar el metal a cortar, además de la aperturas por donde sale el oxígeno. Estos se llaman orificios.

regulator: regulador: el dispositivo que se emplea en las botellas (cilindros) de gas para controlar la cantidad de gas que sale y para mantener constante su salida.

safety glasses: anteojos de seguridad: gafas sin colorido que se llevan para proteger los ojos al soldar o esmerilar.

stinger: aguijón: en el idioma popular del soldador: el encaje del electrodo.

striker or spark lighter: encendedor del soplete (chispeador): un dispositivo que se emplea para encender el gas del soplete soldador.

tip: boquilla: la pieza del soplete por la cual sale el gas, algunas veces dicha "tobera". El diámetro de su apertura determina su tamaño, graduado de 0 a 15.

vise grip: tenazas de agarre de tornillo: una herramienta semejante a las tenazas de traba.

whip: látigo: en el idioma popular del soldador se díce así el encaje de electrodo y el cable ligero a que está conectado. Es un dispositivo liviano que el soldador puede llevar fácilemente de un lado para otro.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

a.c.: alternating current: corriente alterna: Se refiere a la fuerza eléctrica que viene de la planta generadora. Cambia de polaridad positiva a negativa 60 veces cada segundo.

acetylene gas: acetileno: gas empleado en la soldadura autógena en conjunto con el oxígeno. Se produce una llama de las más altas obtenibles (6300°F - 3500° C) y que rápidamente funde el acero para la soldadura por fusión.

air-cooling: enfriamiento al aire: el tratamiento de un metal que permite su enfriamiento al aire en vez de apagarlo en el agua o el aceite.

alloy: aleación: mezcla de dos o más metales.

amperage: amperaje: intensidad de una corriente eléctrica medida en amperios. En la soldadura, cuanto más alto el amperaje tanto más caliente será el arco.

annealing: recocido: un proceso que permite que el metal se trabaje más fácilmente a máquina. También elimina la tensión en el metal una vez que se suelde.

anvil: yunque: un bloque pesado de hierro o acero que sirve para labrar a martillo los metales.

arc: arco: el movimiento de la electricidad por el aire. Se produce una alta temperatura. El arco pasa del electrodo al metal base.

arc-air cutting: corte por arco y aire: corte de un metal mediante el empleo de electrodo de carbón que funde el metal que luego se lleva mediante un soplo de aire compresado.

arc blow: desvío del arco: se refiera a la propensión que tiene el arco a desviarse o mover como látigo en vez de seguir su curso normal en la soldadura.

arc length: largo del arco: la distancia entre la punta del electrodo al metal base.

argon gas: argón: un gas sin color e inerte, empleado en la soldadura para proteger el metal fundido de la influencia dañosa de los gases atmosféricos. Se emplea en la soldadura del aluminio.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

base metal: metal base: el metal a soldarse.

bend test: prueba de doblaje o torsión: Prueba física que se emplea para poder juzgar la calidad de la soldadura.

bevel: bisel: un corte al metal que se hace a un ángulo:

← corte a bisel

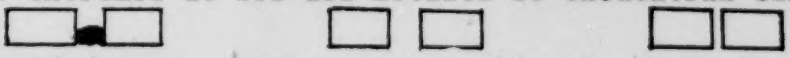
blower: ventilador: un sistema (grande) en el taller o lugar de trabajo para aspirar y echar para afuera todo el humo y gases de la soldadura.

blowholes: agujeros de burbuja: huecos o cavidades causadas por la presencia de burbujas de gas atrapadas en el metal durante la solidificación de la soldadura.

blueprint: heliógrafo: copia heliográfica (o fotográfica) de un dibujo original. En la soldadura, el heliógrafo sirve para informar al soldador de las medidas y la forma de la pieza.

bolt: tornillo (perno): pieza de varilla de metal con cabeza redonda por un extremo y rosca por el otro para recibir una tuerca.

butt joint: junta de tope: una junta en la que los bordes o extremos de los dos metales se encuentran sin traslapo.



soldadura junta en tope abierta junta en tope cerrada

case hardening: cementación: proceso mediante el cual se modifica la superficie de un acero blando

cast iron: fierro fundido: un material ferroso con un alto percentaje de carbón. Muy quebradizo y difícil de soldar porque se agrieta tan fácilmente.

chamfer: chaflán: el chaflán se hace en el metal cortando por un plano una esquina del mismo.

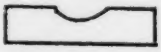
← corte chaflán

circuit breaker: interruptor (de circuitos): un aparato de seguridad en forma de rilai (rele o contactor-disyuntor) interrumpe la corriente en caso de sobrecarga, no se tiene que reponer el interrumptor al abrirse el circuito, sólo se tiene que reajustar.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

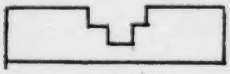
circumference: circunferencia: la distancia por la orilla de un círculo; el perímetro de un círculo.

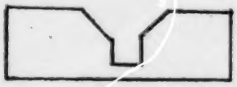
concave: cóncavo: una depresión curvada. 

conductor: conductor: cualquier material en forma de alambre, cable, o barra que permite el paso libre de la corriente eléctrica.

convex: convexo: forma esférica, abombada exteriormente. Forma curvada que tiene la superficie más alta por el medio que por el borde.

corrosion: corosión: el desgaste de un metal debido a varias condiciones atmosféricas.

counterbore: perforación aumentadora: taladrar un agujero secundario de diámetro mayor que la perforación original y centrado igual. 

countersink: avellenar: ensanchar los agujeros que se abren para los tornillos, a fin de que entre su cabeza en la pieza taladrada. 

crack (tank valves): abrir y cerrar rápidamente una válvula (en el tanque) de gas para asegurarse (cerciorarse) de su funcionamiento sin obstrucción.

crater: crater: depresión en la cara de una soldadura, generalmente en la terminación de una soldadura de arco.

cover pass: pase final: el pase que se hace al terminar una operación de soldadura para dar al trabajo un acabado adecuado: el cordón final

d.c. (direct current): corriente directa: Se refiere a la corriente eléctrica de las baterías (acumuladoras o pilas), y se puede convertir en corriente alterna. Es positiva o negativa, segun la dirección en que camina la corriente.

diameter: diámetro: el largo de una línea que pasa por el centro de un círculo y que termina en la circunferencia en cada uno de sus extremos.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

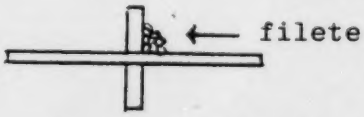
ductility: ductibilidad: la habilidad de un metal para resistir estirarse, doblarse, o torcerse sin que se quiebre o se agriete.

electrode: electrodo: un alambre delgado recubierto de una substancia especial. Se emplea para metal de aporte para juntar el metal a soldarse; tanbién se emplea en forma de un alambre desnudo montado en un carrete para que no sea necesario arrancar y pararse con tanta frecuencia.

ferrous metals: metales ferrosos: los metales básicamente formados de hierro.

filler rod: varilla (alambre) de aporte: alambre o varilla que se funde y se agrega al pudelado (pudelaje) para producir la globosidad adecuada, y por fin el cordón de la soldadura.

fillet: filete: semejante a la junta en T salvo que más de un pase se da sobre la junta al hacerla.



flash: ráfaga: el impacto de los rayos del arco eléctrico en el ojo humano.

flat joints: juntas planas: cualquier de las juntas de soldura formadas con el metal en posición, horizontal.

flux: flujo: substancias químicas que se emplean en los procedimientos de soldar para conseguir mejor fusión de los metales. Se emplea el flujo también para limpiar el sitio a soldarse.

fuse: fusible: un dispositivo de seguridad que se abre o se funde cuando hay sobrecarga en la corriente eléctrica, por ejemplo cuando se emplean a un sólo tiempo un número excesivo de aparatos eléctricos.

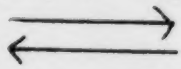
fuse box: caja de fusibles: receptáculo central donde todos los fusibles del circuito eléctrico en un edificio se colocan.

hard surfacing: revestimiento duro: procedimiento de aplicar una capa dura de metal a la superficie o los bordes de las piezas desgastadas de maquinaria para hacerlas resistentes al desgaste.

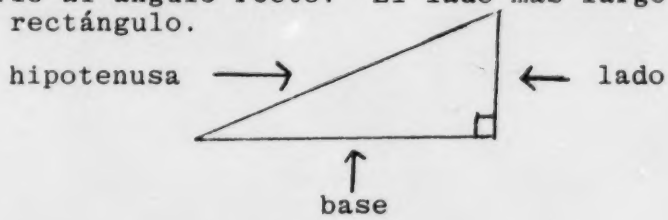
COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

horizontal: horizontal: paralelo al horizonte: moviéndose de un modo atravesado, de izquierda a derecha, o vice versa.



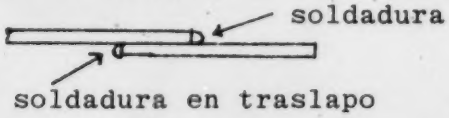
hypotenuse: hipotenusa: el lado de un triángulo rectángulo contrario al ángulo recto. El lado más largo de un triángulo rectángulo.

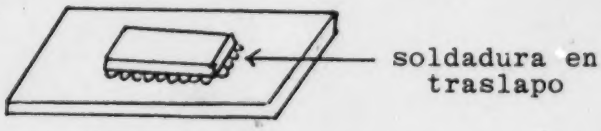


infrared ray: rayo infrarrojo: rayos caloríficos que se producen al soldar. Estos rayos queman ojos y piel si no se tapan durante el procedimiento.

joints: juntas: Véase "butt joints - juntas de tope", "lap-joint - junta en traslaplo", "T-joint - junta-T o junta en T", "flat joint - junta-plana", y "fillet - filete".

lap joint: junta en traslapo: junta en que los bordes de los metales a unirse se traslapan; es decir, se colocan uno sobre el otro.





M.I.G. welding: soldadura de metales en atmósfera de gas inerte: la sigla o abreviatura (M.I.G.) en inglés, o MAGI, MAGI en español. Proceso de soldar en la que el arco está circundado o contenido en una atmósfera de gas inerte (ejemplo: el argón) que excluye al aire y así prohibe su reacción con el electrodo y el metal base.

molten metal: metal fundido: la condición de metal cuando se calienta hasta derretirse y se convierte en fluido.

non-ferrous metal: metal no ferroso (no férreo): los metales que no se oxidan porque no contienen el hierro.

nut: tuerca: un pequeño bloque de metal en varias formas que perfora y trae una rosca correspondiente a la de un tornillo.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

ohm: ohm: la unidad de medición de la resistencia que tiene un alambre o circuito al pase de una corriente eléctrica. Cero ohm significa sin resistencia, o un circuito cerrado.

overlap: solapo: una condición en que el metal de la soldadura se extiende sobre el metal base y no se funde con él en forma adecuada. Puede resultar de una falta de amperaje en la soldadura de arco o una temperatura inadecuada en la autógena, o de otras causas.

oxygen gas: oxígeno: el gas elemental que sostiene la combustión. Acelera la temperatura de la llama al mezclarse con el acetileno en la soldadura autógena.

padding: almohadillar: el procedimiento de reconstruir la superficie desgastada de las flechas, ruedas, y otras piezas de la maquinaria. La operación consiste en depositar varias capas de glóbulos de metal uno por uno y uno y uno encima del otro.

pass, root: pase de la raíz: el primer pase o serie de glóbulso que se hace para una soldadura en filete: el cordón inicial (el coldón básico).

pass, filler: pase de aporte: el pase o serie de pases después del pase raíz.

pass, cover: pase de revestimiento: el pase final para dar a la soldadura buen aspecto y reforzarla: el cordón de sello, el cordón de cierre.

penetration: penetración: el alcance de la fusión del metal del eléctrodo o varilla con el metal base; la profundidad que tendrá la fusión en el metal base: el cordón saliente de la raíz o de penetración.

polarity: polaridad: indica la dirección de la corriente en un circuito eléctrico.

porosity: porosidad: la formación de agujeros como de alfiler en el metal de la soldadura, debida a la contaminación por la atmósfera.

postheating: postcalefacción: calefacción del metal base posterior a la soldadura.

preheating: precalefacción: calentar el metal antes que se suelde para prevenir que se agriete.

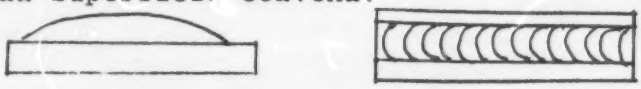
quenching: apagamiento: el tratamiento que se da a un metal

para templarlo, sumergiéndolo repentinamente a un bano de agua, aceite, u otro.

radius: radio

ripple: rizo: Forma que toma un glóbulo metalico debido al movimiento del electrodo o del soplete: Resulta el cordón.

ripple beads: cordón en rizo o sencillamente rizo: Se dice del aspecto que tiene el metal al enfriarse un glóbulo tras otro al moverse el electrodo o soplete. La globulación debe tomar la forma de una serie de líneas semi-ciruclars sobre una superficie convexa.



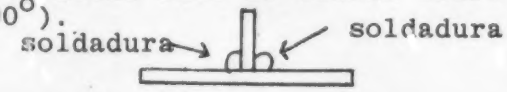
slag: escoria: la capa proectora que se quita de una soldadura al enfriarse.

solder: soldadura: clásicamente, desde tiempos antiguos, una aleación del estaño con el plomo que se emplea para unir dos superficies; se emplea con una temperatura baja. No se funden los dos metales o pedazos de metal , sólo se adhiere este tipo de soldadura a la superficie de los metales como el pegamento cuando se emplea con el papel o la madera.

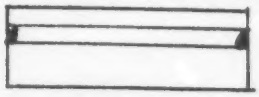
solidify: solidificar: Se dice del metal cuando pasa del estado líquido al estado sólido al enfriarse.

stress (tensile stress): esfuerzo de tensión: la resistencia interna de un material a la deformación.

T-joint: junta en T: junta en la que el borde de un metal a juntarse con el metal base se coloca sobre éste a un ángulo recto (90°).



tack or tack weld: junta por puntos (en puntos): una soldadura poco profunda y generalmente provisional para mantener en alineamiento un metal.



tensile strength: resistencia a la tensión: La resistencia a estirarse que tiene un metal, medida en libras por pulgada

cuadrada (PSI). En la soldadura se dice del esfuerzo necesario para poder partir el material empleado para formar la junta de los metales.

tolerance: tolerancia: La diferencia o variación (o error) consentida en la medida al soldarse una pieza.

torch: soplete: instrumento que el soldador emplea al soldar o cortar un metal con el gas acetileno como combustible. Mediante la llama que se produce en la boquilla del soplete se realizan varias operaciones de la soldadura o del corte.

track torch: soplete con carrito guía: Igual que el soplete, excepto el soplete viene montado en un carrito guía impulsado por un motor que camina sobre riel o rieles para producir un corte recto o angular.

travel speed: velocidad de recorrido: La velocidad a que se hace caminar la globulación o metal fundido (el pudelaje) al soldar un objete.

undercut: depresión: Porción de la soldadura que está más bajo que la superficie del metal base: Esta condición viene ocurriendo comúnmente debido a un amperaje excesivo.

vee-butt: junta en V: Una junta de tope en la que los dos pedazos de metal se unen para formar una "V".

vertical: vertical: Perpendicular al horizonte: moviendo de una posición inferior (el pie) o desde abajo hacia una posición superior (la cabeza) o hacia arriba, en línea recta, o vice versa.

voltage: voltaje: Fuerza que hace que los electrones libres corren en el circuito, o bien, la fuerza eléctrica que se mide en voltios. En la soldadura el voltaje se ajusta con el amperaje para dar un arco constante y uniforme.

voltage drop: descenso de voltaje: Condición que ocurre cuando la corriente tiene que caminar una larga distancia: Habrá un voltaje más alto donde comienza el cable que al otro extremo donde termina. En la soldadura, el descenso en el voltaje se contrarresta aumentándolo al comienzo para compensar la pérdida.

COMBINATION WELDING: Technical Terms

SOLDADURA: Terminología Técnica

weld bead: cordoncillo (globulación) de la soldadura: Cordoncillo que se forma en la junta de soldadura como resultado de la fusión de los metales al agregar la varilla o alambre durante la operación de soldar. Al terminarse la soldadura el metal de soldadura depositado sobre el metal base se dice "cordoncillo de soldadura", o "el cordón".

weld puddle: pudel (glóbulo de soldadura: porción de la soldura que está fundido donde se aplica el calor.

COMBINATION WELDING TECHNICAL TERMS

ENGLISH-LAOTIAN LEXICON

CAREER DEVELOPMENT CENTER
SCHOOL OF TECHNICAL CAREERS
SOUTHERN ILLINOIS UNIVERSITY
CARBONDALE, ILLINOIS

COMBINATION WELDING TECHNICAL TERMS

ENGLISH-LAOTIAN LEXICON

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TRANSLATED BY

SOMCHAI THIPKHOSITHKUN

The preparation of this multicultural series was aided financially through funding agreements with the Illinois State Board of Education/Department of Adult, Vocational and Technical Education.

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June 1[illegible]

ARDEN L. PRATT, DEAN
E. HOLLIS MERRITT, ASST. DEAN
LARRY HEPBURN, CENTER DIRECTOR

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Technical Terms 3

(ಬಾಸಾಕಲ್ಯಕ್ಕಾಗ್ರಾಂಗ್ರಾಂಗ್ರಾಂಗ್ರಾಂ)

WELDING: Technical Terms - Equipment

air grinder: ເຄື່ອງຫລີດເລະ:ຝົນເຂດ່ມເຫຼັກ ຊຶ່ງມີຄ້ຳເຂຍງຄົນຂອງລົມ.

brush, wire: ແປງສວດ ໄຊ້ສຳລັບຫລີດສ້ຳ ໝັ້ງ.

cable: ສາຍເຮັດດ້ວຍເຫັ້ມເຫຼັກ.

C-clamp: ເຫຼັກຈັບ ທີ່ມີ ຮູ ຍ່ຶ ງ ເປັນ ຮ ອ ບ ຫ ວ ຈ (C).

cutting head: ສ່ານ ອັ ນ ເ ຈ້ ອ ມ ຕ ິ ລ ະ: ສຳ ລ ັ ບ ໄ ຊ້ ຕ ັ ດ ເ ຂ ດ ່ ມ ເ ຫ ຼ ັ ດ.

electrode holder: ອັ ນ ຈ ັ ບ ອ ີ ເ ລ ັ ກ ໂ ຕ ຣ ດ (E l e c t r o d e) ຂ ອ ງ ເ ຄ ື ່ ອ ງ ເ ຊ ື ່ ອ ມ ເ ຫ ຼ ັ ດ ຊ ຶ ່ ງ ມ ີ ຄ ້ ຳ ເ ຂ ຍ ງ ເ ປ ັ ນ ສ ີ ຟ ້ າ.

gloves, gauntlet: ຖ ຸ ງ ມ ື.

ground clamp: ອ ັ ນ ຈ ັ ບ ເ ຫ ຼ ັ ດ ຊ ຶ ່ ງ ມ ີ ຄ ວ ິ ວ ລ ິ ບ (ສ າ ຍ ດ ິ ນ).

hammer, chipping: ໄ ມ ້ ຄ ້ ອ ນ ຊ ຶ ່ ງ ມ ີ ຄ ວ າ ມ ຫ ັ ນ ໜ ັ ກ ເ ຮ ອ ດ.

helmet: ໝ ວ ກ ທ ີ ່ ມ ີ ເ ຂ ວ ນ ປ ້ ອ ງ ກ ັ ນ ເ ຂ ສ ງ ເ ປ ັ ນ ອ ັ ນ ຕ າ ຍ ຕ ່ ຳ ສ າ ຍ ຕ າ.

hose: ສ າ ຍ ທ ີ ່ ມ ີ ເ ປ ັ ນ ບ າ ງ.

lens, clear: ເ ຂ ວ ນ ຊ ຶ ່ ງ ມ ີ ສ ີ ຂ າ ວ.

lens, filter: ເ ຂ ວ ນ ຊ ຶ ່ ງ ມ ີ ຄ ວ າ ມ ເ ຂ ສ ງ.

lighter spark: ປ ະ ກ າ ຍ ໄ ຟ ຊ ຶ ່ ງ ມ ີ ອ ່ ອ ນ.

orifice: ສ ່ ານ ເ ຄ ື ່ ອ ງ ຕ ັ ດ ເ ຫ ຼ ັ ດ ທ ີ ່ ມ ີ ຮ ູ.

regulator: ເ ຄ ື ່ ອ ງ ປ ັ ບ ຈ ຳ ນ ວ ນ ຂ ອ ງ ຫ ້ າ ສ ນ າ ລ າ ຫ ນ ້ ຳ ເ ຫ ຼ ັ ດ.

WELDING: Technical Terms - Equipment (cont.)

safety glasses: ແວ່ນຕາກັນ ອຸປະຕິເຫດ.

stinger: ຈັບຂອງຊ່າງເຊື່ອມເຫັຼກ ໝາຍຄວາມວ່າ ອັນ ຈັບ ອີເລັກໂຕຣອ (Electrode).

striker or spark lighter: ເຄື່ອງມື ຈຸດ ປະກາຍໄຟ.

tip: ປາຍຂອງ ເຄື່ອງ ມື ເຊື່ອມ.

vise grip: ຄີ້ມ ທີ່ຈັບ ວັດຊຸ ແຄັວ ປ່ອຍ ມື ແຕ່ກັນ ຍັງ ຈັບ ແໜ້ນ ຢູ່.

whip: ຄໍາ ຂອງ ຊ່າງ ເຊື່ອມ ເຫັຼກ. ໝາຍ ຄວາມ ວ່າ ທີ່ ຊີ ຕິດ ຕົວ ຄໍາ ລັບ ໃຊ້ Electrode ທີ່ ເບົາ ໆ

WELDING: Technical Terms

a.c.: Alternate current ກະແສໄຟ ສະລັບ.

acetylene gas: ທາດ ອະເຊຕີລີນ (Acetylene).

air-cooling: ປ່ອຍໃຫ້ເຢັນ ລົງໂດຍທຳມະຊາດ.

alloy: ໂລຫະ ສະຫົມ.

amperage: ໜ່ວຍວັດຈຳນວນກະແສໄຟຟ້າ ເປັນແອມແປ (Ampere)

annealing: ການເຮັດໃຫ້ເນື້ອໂລຫະ ສະຫົມອ່ອນ ເຮັດໃຫ້ງ່າຍຂึ้น.

anvil: ຫລັກເນື້ອ ທີ່ໝັ້ນ ໃຊ້ສຳລັບຕຽນ ຮູ ຕີ.

arc: ປະກາຍໄຟ ທີ່ກະໂດດຈາກຫົວ (Electrode) ມີ່ໄປຫາ ວັດ ມີ.

arc air-cutting: ການໃຊ້ປະກາຍໄຟ ທີ່ກະໂດດ ສຳລັບຕັດເນື້ອ.

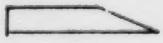
arc blow: ການເຫັນ ປະກາຍໄຟ ມັກຈະເລື່ອນ ຫັນໄປ ມາ ບໍ່ຢູ່ທີ່ ທີ ສະ ເຊື່ອມ ຢູ່.

arc length: ຂະ ນະ ລະ ຫ່ວງ ຂອງ ຫົວ ຫັ ເຕ ຕ ປະ ກາ ຍ ໄ ຟ.

argon gas: ທາດ ອາກອນ ຊຶ່ງ ບໍ່ ມີ ໄ ຟ ໃ ຊ້ ສຳ ລັ ບ ເ ຊື່ ອ ມ ອ ະ ລູ ມິ ນ ຽ ມ (Aluminium).

base metal: ເນື້ອ ທີ່ ຈະ ຕ້ອ ງ ເ ຊື່ ອ ມ.

bend test: ການ ທົ ດ ສອ ບ ໂ ດ ຍ ການ ງໍ ຕົ ວ ເ ນື້ ອ ທີ່ ເ ຊື່ ອ ມ.

bevel:  ← ຫັ ດ ເ ຂ ບ ປ ະ ສ ານ.

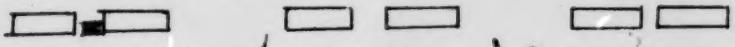
blower: ເ ຄື່ ອ ງ ຕ ຽ ດ ລົ ມ ເ ຊ ລ. ຄ ວ ນ ຍ ອ ກ ຈ າ ກ ຫ ນ້ ອ ງ.

WELDING: Technical Terms (cont.)

blowholes: รูตัดขึ้น เนื่องจากอากาศถังอยู่ในเหล็กขณะเชื่อมอยู่.

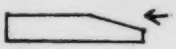
blueprint: เอกสาร สำเนาจั่งให้ช่างเชื่อมเหล็กทำตาม

bolt: น็อตตัวผู้ที่มีทรง.

butt joint: 
การเชื่อมข้างสองข้างเข้าทัน โดยยี่ให้ทับทัน.

case hardening: การเรัดให้เหล็กแข็งแต่ขึ้น.

cast iron: เหล็กสี่ แข็งและเผาะ เรัดให้เชื่อมยากหาย.

chamfer:  การตัดเหล็กสลงแต่ซ่อมปาย ยังมีหน่วยอยู่.

circuit breaker: เคื่องมีปอ้งกันเวลา เคื่องมีที่ไว้ตัดเสัง จะเรัดให้เคื่องมี และสายไฟต่างลุกใบ้เสียหาย.

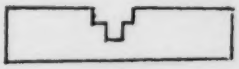
circumference: เส้นรอบวิงทิม.

concave: เป็นรูปโค้งลงเหมือนบ่วง.

conductor: ตัวนำไฟฟ้า.

convex: เป็นรูปโค้งขึ้นจากแผ่นเหล็ก.

corrosion: เหล็กกัดกับอากาศ เป็นขี้หมัง.

counterbore:  การเจาะรูใหญ่ อันที่สองโดยไว้จุดสูมกางอันดูงกัน.

WELDING: Technical Terms (cont.)

countersink: ການເຈາະ ຮູທີ່ຮອງ

crack (tank valves): ການຕວດດູ ໂດຍການ ເປີດ ແລະ ປິດ ລົ້ນ (Valve) ວ່າ ບໍ່ມີ່ຫຍັງຕັນ ຢູ່ຂ້າງ ໃນ.

crater: ເປັນ ຫຼຸມ ລົງ ຈາກ ເຊົ່າ ເຊື່ອມ ໂດຍ ເຄື່ອງ ເຊື່ອມ ໄຟ ຟ້າ

cover pass: ການ ເຊື່ອມ ຜ່ານ ຄັ້ງ ຈຸດ ທ້າຍ ຈາກ ຫຼາຍ ຄັ້ງ.

d.c.: **Direct current**: ກະ ແຈ ຕົງ.

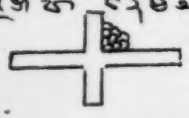
diameter: ເຈັ້ນ ຜ່າ ຈນ ກາງ.

ductility: ເຫັ້ກ ຫຼື ໂລ ຫະ ທີ່ ຍືດ ຕົວ ແລະ ບີດ ຕົວ ໄດ້ ຈັກ ໜ່ອຍ ໂດຍ ບໍ່ ແຕກ ຫຼື ຫັກ.

electrode: ເຫັ້ກ ທີ່ ເປັນ ຕົວ ເຊື່ອມ ໂລ ຫະ ຫຸ້ມ ດ້ວຍ ຈາມ ຢ່າງ ອື່ນ ທີ່ ຊ່ວຍ ໃຫ້ ການ ເຊື່ອມ ຈະ ດວກ ຂຶ້ນ.

ferrous metals: ໂລ ຫະ ທີ່ ມີ ເຫັ້ກ ເປັນ ຈ່ວນ ໃຫ່ງ.

filler rod: ເຫັ້ກ ຊະ ນິດ ເປັນ ລວດ ໃຊ້ ສຳ ລັບ ເພີ່ມ ເຕີ່ມ ຄວາມ ໜາ ຂວງ ຮອຍ ເຈັ້ນ ເຫັ້ກ ທີ່ ເຊື່ອມ.

fillet:  ການ ເຊື່ອມ ເຫັ້ກ ທີ່ ຕັ້ງ ເປັນ ມຸມ ແລະ ເຊື່ອມ ຫຼາຍ ຄັ້ງ.

flash: ປ ກາຍ ໄຟ ແລບ

flat joints: ການ ເຊື່ອມ ໄຟ ຟ້າ ເທິງ ແຜ່ນ ເຫັ້ກ ທີ່ ແບນ.

flux: ຈາຍ ເຄມີ ຊ່ວຍ ໃຫ້ ເຊື່ອມ ງ່າຍ ຂຶ້ນ ໂດຍ ເຮັດ ໜ້າ ທີ່ ລ້າງ ບ່ອນ ຈະ ເຊື່ອມ ເຫັ້ກ.

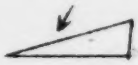
fuse: ເຄື່ອງ ປ້ອງ ກັນ ກະ ແຈ ໄຟ ຟ້າ ທີ່ ແລ່ນ ຜ່ານ ຢ່າງ ຫຼາຍ ທັນ ໄດ ເຮັດ ໃຫ້ ຕົວ ປ້ອງ ກັນ (Fuse) ຂາດ.

fuse box: ບ່ອນ ເກັບ ຮັນ ປ້ອງ ກັນ ກະ ແຈ ໄຟ (Fuse).

WELDING: Technical Terms (cont.)

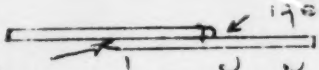
hard surfacing: การเชื่อมให้เรียบเสมอกันทั้งหน้า ของเรียบเสมอเหล็ก ที่ของเหล็กให้เรียบสม ส่วนใหญ่ใช้ของเครื่องจักรที่สึกหรอมาก.

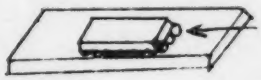
horizontal: ⟷ การเดินทางไปมาจากซ้ายไปขวา ตรงกันข้าม.

hypotenuse:  ด้านที่ยาวที่สุดของสามเหลี่ยมที่มีมุมฉาก ในรูปสามเหลี่ยมที่มีมุมฉาก

infrared ray: เรียกว่ารังสีใต้แดง เวลาเชื่อมเหล็ก ต้องใช้แว่นตา ของช่างเชื่อมเหล็ก เนื่องป้องกันสายตา.

joints: ที่เชื่อมต่อต่างๆ.

lap joint: 



การเชื่อมโดยเรียงเหล็กทับกัน.

M.I.G. welding: ย่อมาจาก HETAL INERT GAS. คือการเชื่อมโดยใช้ก๊าซเฉื่อยช่วย ป้องกันไม่ให้ก๊าซ ถูกปนเปื้อนไปของ ๆ.

molten metal: เหล็กที่หลอมเป็นของเหลว เรียกว่าไหลได้.

non-ferrous metal: โลหะที่ไม่มีเหล็ก เรียกว่าไม่มีสนิม.

nut: มะยม.

ohm: หน่วยวัดความต้านทานของกระแสไฟ เรียกว่าโอห์ม (ohm).

overlap: เหล็กเรียงซ้อนกันทับกัน โดยไม่ได้เชื่อมติดกัน เกิดจากการเชื่อมไม่ดี.

oxygen gas: ก๊าซออกซิเจน ช่วยให้เกิดอุณหภูมิสูงขึ้น.

padding: การเพิ่มเติมด้านหน้าของเหล็กที่เสีย (บิ่ม) โดยใช้การเชื่อม ซึ่งเชื่อมเหล็กติดลงไปหายสึกจนเต็ม.

pass, root: การเชื่อมส่วนเหล็กตั้งเรียง.

pass, filler: การเชื่อมส่วนเหล็กตั้งที่ของ.

WELDING: Technical Terms (cont.)

pass, cover: ການ ເຊື່ອມ ເທື່ອ ລະ ຫນຶ່ງ ຄັ້ງ ສຸດ ທ້າຍ.

penetration: ການ ເຊື່ອມ ລະ ລົງ ເລິກ ເຂົ້າ ໄປ ເຖິງ ພາ ກ ຂອງ ແຂ່ນ ໂລ ຫະ

polarity: ຂອ ບ ເຂດ ເດີ ນ ຂອ ງ ກະ ແສ ໄຟ ຟ້າ.

porosity: ການ ເກີ ດ ເປັ ນ ຮູ ແຄ ະ ຕ ອ ມ ນ້ ອ ຍ ການ ແຂ ວ ນ ໂລ ຫ ະ ຫຼ ື ໂລ ຫ ະ.

postheating: ແລ ະ ແຂ ວ ນ ໂລ ຫ ະ ໃ ຫ ້ ຮ ້ ອ ນ ຢ ູ ່ ຫ ຼ ັ ງ ຈ າ ກ ໄ ດ ້ ເ ຊ ື ່ ອ ມ ແ ລ ້ ວ.

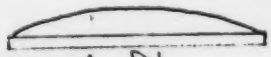
preheating: ແລ ະ ແ ຂ ວ ນ ໂ ລ ຫ ະ ໃ ຫ ້ ຮ ້ ອ ນ ກ ່ ອ ນ ເ ຊ ື ່ ອ ມ ເ ພ ື ່ ອ ປ ້ ອ ງ ກ ັ ນ ການ ແ ຕ ກ ຫ ັ ກ.

quenching: ການ ເ ຮ ັ ດ ໃ ຫ ້ ໂ ລ ຫ ະ ເ ຊ ິ ງ ລ ົ ນ ໄ ດ ້ ການ ໃ ຫ ້ ເ ຢ ็ ນ ລ ົ ງ ຢ ່ າ ງ ໄ ວ ໂ ດ ຍ ການ ຈ ຸ ້ ມ ນ ້ ຳ ຫ ຼ ື ນ ້ ຳ ມ ັ ນ ເ ປ ັ ນ ຕ ົ ນ.

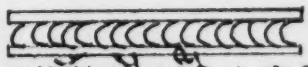
radius: ການ ເ ຮ ັ ດ ໃ ຫ ້ ມ ຸ ມ ມ ົ ນ ບ ໍ ່ ມ ີ ຂ ອ ບ ຫ ຼ ຽ ມ ຄ ົ ມ.

ripple: ຮ ູ ບ ຮ ່ າ ງ ຂ ອ ງ ຂ ັ ້ ນ ເ ຊ ື ່ ອ ມ ທ ີ ່ ເ ປ ັ ນ ຄ ື ນ ໆ

ripple beads:



ເ ມ ັ ດ ຂ ອ ງ ເ ຂ ັ ້ ນ ທ ີ ່ ເ ຊ ື ່ ອ ມ



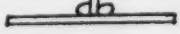
ເ ມ ັ ດ ຂ ອ ງ ເ ຂ ັ ້ ນ ທ ີ ່ ເ ຊ ື ່ ອ ມ ຫ ລ າ ຍ ໆ ຄ ັ ້ ນ.

slag: ຂ ີ ້ ປ ູ ກ ທ ີ ່ ລ ອ ຍ ຢ ູ ່ ເ ທ ິ ງ ເ ຂ ດ ເ ຊ ື ່ ອ ມ ທ ີ ່ ເ ຊ ື ່ ອ ມ ຫ ຼ ັ ງ ຈ າ ກ ເ ປ ັ ນ ສ ິ ງ.

solder: ທ ອ ງ ແ ລ ະ ສ ົ ມ ຕ ັ ບ ຄ ື ບ ຸ ກ ນ ຳ ໃ ຊ ້ ສ ຳ ລ ັ ບ ເ ຊ ື ່ ອ ມ ໂ ລ ຫ ະ ເ ນ ື ້ ອ ຄ ວ ບ ຄ ູ ່ ກ ັ ນ.

solidify: ຄ ຳ ນ ິ ຍ າ ມ ຂ ອ ງ ຄ ຳ ວ່ າ ເ ຫ ຼ ັ ກ ທ ີ ່ ຈ ະ ແ ຂ ງ ຕ ົ ວ ເ ມ ື່ ອ ເ ຢ ็ ນ ສ ິ ງ.

stress: ໂ ລ ຫ ະ ທ ີ່ ພ ະ ຍ າ ຍ າ ມ ບ ີ ບ ງ ໍ ງ ູ ບ ເ ມ ື່ ອ ມ ີ ກ ຳ ລ ັ ງ ພ າ ບ ມ ອ ກ ມ າ ເ ຮ ັ ດ ໃ ຫ ້ ຮ ູ ບ ງ ໍ ງ ູ ບ.

T-joint:  ການ ເ ຊ ື ່ ອ ມ ເ ຫ ຼ ັ ກ ຕ ິ ດ ໂ ດ ຍ ຫ ລ ອ ຍ ຂ ອ ງ ສ ອ ງ ຄ ັ ນ ເ ຮ ັ ດ ມ ຸ ມ 90° ເ ປ 	s.

tack or tack weld: ການ ເ ຊ ື ່ ອ ມ ຕ ິ ດ ເ ປ ັ ນ ຈ ຸ ດ ໆ ຫ່ າ ງ ກ ັ ນ ເ ພ ື ່ ອ ຍ ึ ດ ແ ຂ ວ ນ ເ ຫ ຼ ັ ກ ໃ ຫ ້ ຄ ົ ງ ທ ີ່.

WELDING: Technical Terms (cont.)

tensile strength: แรงดึงอย่างสูงที่สุด ที่จะรักให้ไว้เรื่องหลุด มีหน่วยเป็น P.S.I (pound per square inch).

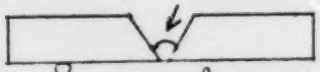
tolerance: จำนวนลาดเป็นที่อะนุยาต ในตามเรื่อง.

torch: ปายของเคื่องเรื่อง ที่ไว้ตัดเหล็กโดยไว้ทำส.

track torch: ปายของเคื่องเรื่อง ที่ตัดอยู่กับเคื่องเดินด้วยไฟฟ้า.

travel speed: สำลับเรื่องเหล็กให้ติง หรือเป็นมุมอย่างหน่วยติง.

undercut: ตามตัดเหล็กโดยกะแสไฟฟ้า หายเต็มไป เรัดให้ยุบลิง.

vee-butt:  แต่ๆเหล็กสองอัน เวลาเรื่องเฉ้า หาตัมเป็นแล้วเหมือนตัวอี "V"

vertical: ↓ ↑ ตั้ง ๆ ลิงๆ.

voltage: กำลังของกะแสของไฟฟ้า มีหน่วยเป็น วอด (Volt) ไว้บ้อยกะแสไฟ ในเคื่องเรื่องไฟฟ้า.

voltage drop: กำไฟฟ้าตัด เมื่องจากกะแสไฟฟ้าต้องเดิน ทางไกลเข้าไปโดยเพิ่มกำลังไฟฟ้า (Voltage).

weld bead: เส้นทางเรื่องเป็นอิงๆเหมือนคั้นๆ.

weld puddle: ส่วนที่ทุกเรื่องหลองละลาย ขณะที่เรื่องอยู่.